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AUDIO VISUAL

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The Effect of Lighting Angle on the Judgment of Photographed Subjects

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ERRATUM

The editors wish to call attention to an oversight in the publication of Vol. 8, No. 5, The Education of the AV Communication Specialist (Supplement 2). Missing from the Seminar Participants on pages 4 and 5 is the name of I. Keith Tyler, Director, Institute for Education by Radio-Television, The Ohio State University. The editors regret this omission.

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Television in Army Training: Color vs Black and White

JOSEPH H. KANNER AND
ALVIN J. ROSENSTEIN

PART I. This study is one of a series of U. S. Army Signal Corps studies designed to investigate and develop the use of television for military training and is the first of two studies on the role of color television. It was carried out during the period April to September 1959 at the Signal School, Fort Monmouth, New Jersey, using television facilities, trainees, personnel, and subject matter available at that installation. Also participating were personnel working in the mobile color facilities of the Army Pictorial Center.

Dr. Kanner is chief of the audiovisual applications office, Army Pictorial Division, Washington, D. C. Dr. Rosenstein is chief of applications section, Television Division, Army Pictorial Center at Long Island. *They wish to express their appreciation to: Ralph Bolvin, Paul Welch, Col. A. L. Burke, Department of Specialist Training, Fort Monmouth, New Jersey; Charles G. Crawford, Cyrus W. Farver, Franklyn M. Stephenson, and George B. Stillwagon, all SP-4, Television Division, Army Pictorial Center, Long Island, New York.*

SINCE 1949, monochrome (black and white) television has been intensively studied and used as a method of instruction, and has achieved acceptance as a means for meeting many important and pressing civilian and military teaching needs. Among users of monochrome television, there have arisen questions about the possible effects of color equipment, particularly in making present equipment obsolete. But, until recently, the general unavailability of adequate color equipment and its high cost have not made these questions urgent.

Reliable color television equipment is now available. Its cost is

higher than monochrome equipment but this factor is expected to be reduced and further improvements in color fidelity and equipment size are promised. Nevertheless, color television equipment will probably always be more expensive to procure and maintain than monochrome equipment. To justify the cost of using color television for training, it would seem reasonable to expect some return in teaching effectiveness and learning not possible with monochrome television. Whether such advantages exist and their nature and extent were the key factors in designing and carrying out the present study.

There are no previous studies comparing the teaching effectiveness of color and monochrome television. While color television is used for teaching medical subjects, this use is governed by such common sense dictates as the need for color in surgery, tissue identification, and diagnosis. There have been some relevant motion picture studies which failed to indicate any important contributions of color to learning (1, 2, 3). It was felt, however, that a more extensive effort was needed before these findings could justifiably be accepted for television.

Study Objectives

The major objective of the present study was to compare the teaching effectiveness of color and monochrome television instruction. Subsidiary analyses were also made of the effects of trainee aptitude and type of subject matter upon learning.

Equipment and Facilities

All instruction was presented live by a mobile color television facility from the Army Pictorial Center, Long Island City, New York. This unit consists of three compatible color image orthicon cameras and associated equipment. A temporary studio was prepared into which the camera equipment was brought while the associated equipment remained in a van just outside. Transmissions from this studio were carried by microwave to the Fort Monmouth TV distribution system where they were transmitted to appropriate classrooms.

Both color and monochrome television were viewed in conventional classrooms at Fort Monmouth using, as appropriate, 21-inch color or monochrome receivers. Trainees were seated about 10 to 30 feet away from the receivers and the number of trainees never exceeded 12 for any one presentation.

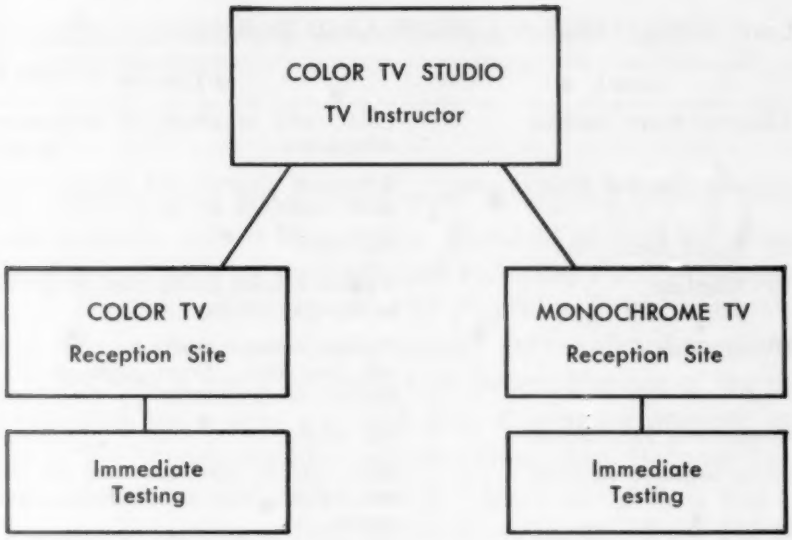

FIGURE I. *Study Design.*

Each presentation emanated from the color studio, and was shown simultaneously to each of the experimental groups. For any one comparison, this design eliminated such problems as instructor differences and kept constant any effects due to time of day of instruction. (See Fig. I.)

Subject Matter

A total of 11 different lessons were televised. They were selected from the Radar, Radio and Pictorial Divisions at Fort Monmouth. The lectures included the operation of various types of electronic equipment and color photography procedures. Only the pictorial subjects used a predominance of color in the instruction. Others used color in various degrees but it was not a predominant factor in the over-all lesson. Table 1 lists the specific lessons used with a brief description of the manner in which color was employed.

No changes were made in instructional method or schedule. Trainees appeared for these classes as they would for regular classes but received their instruction by television. Each lesson was repeated an average of three times.

TABLE I—LESSONS USED IN STUDY

Lesson	*Content*
1. Complex Wave Analysis	Color used in charts to emphasize wave differences.
2. Cathode Coupled Multivibrator	Schematic diagram and voltage waveshapes used. Little use of color.
3. RF Signal Generator	No color.
4. RF Amplifier	Various colored chalks used on green board to explain circuitry.
5. IF Amplifier	Various colored chalks used to explain circuit operation. Color code of IF transformer shown in color.
6. Foster-Seely Discriminator	No color.
7. Phase Sensitive Rectifier	Multi-colored schematic used for emphasis and differentiation in explaining circuit operation.
8. Automatic Range Tracking	Color used in black diagrams and animated chart.
9. Photo Materials for Copying	Color used to illustrate proper selection of copying material.
10. Introduction to Color	Colored photos, charts and diagrams used extensively.
11. Photographic Films and Characteristics	Extensive use of colored photos.

Tests

All comparisons were based on multiple choice tests given immediately after the instruction. Various test items were suggested by the instructors and, with any necessary modifications by the research personnel, presented in mimeographed form.

An effort was made to incorporate "color" items into the tests. These were items in which color seemed to play a relevant role in understanding or answering the question. An example would be showing various colored resistors and asking for their value in ohms. The two criteria that a question had to satisfy in order to be classified as a color item were: (a) the use of color as an integral part of the phrasing of a question; and (b) the requirement for knowledge regarding specific color information in order to answer the question correctly.

Fifteen minutes were found to be adequate for completing the tests. The answer sheets were handscored and tally sheets used to combine separate classes who had watched a given lesson. This procedure pro-

vided cumulative color and monochrome groups for each of the 11 subjects used in the study.

Trainees

The trainees were 368 enlisted men undergoing regular training in various divisions at Fort Monmouth. Matched pairs of these men were assigned to the color or monochrome receiving sites. As appropriate, either an electronics aptitude score or general technical score was used. In matching, a roster was made ranking these enlisted men according to their aptitude score. They were then assigned to one of the receiving sites based on the toss of a coin. Later, if someone dropped out from the study, his opposite number was also eliminated. Because the lessons were selected from various phases of a training cycle, it was possible for a trainee to view more than one of the telecasts. Of the 368 trainees, 122 saw three telecasts, 62 saw two, and 184 saw only one. Where multiple viewing occurred, it was confined solely to one of the experimental conditions and no trainees viewed both the color and monochrome presentations. Instruction by television is long established at Fort Monmouth and the trainees were not informed that they were participating in an experiment.

Instructors

Seven instructors participated. Four instructors were responsible for one lesson each, two were responsible for two lessons, and one instructor presented three different lessons. Under the study conditions, each instructor simultaneously taught both the color and monochrome sited classes. They taught as they would in the classroom. Where color seemed to be important, the colors were pointed to and described so that the monochrome groups would hear the names of the colors being used.

Training Site

Both color and black and white television were received in classrooms normally used for daily instruction at Fort Monmouth. Each of the three divisions (Radio, Radar, and Pictorial) used classrooms in their own sections. Within a division the same two classrooms were used for presentations throughout the study and were only differentiated by the type of receiver, i.e., color or monochrome. The 21″ receivers were

distributed one to a classroom. At no time did the number of students in a classroom exceed 12. Students were seated 10 to 30 feet away from the TV receiver. Each student was seated at an angle which presented him with a minimum of glare and reflection from outside light.

Television Instruction

The TV production staff included a program director, production supervisor, technical director, floor director, and audio lighting specialists. The technical staff consisted of three video engineers, three cameramen, two microwave technicians, and two maintenance men.

Three compatible color cameras were used in each presentation, each equipped with 50mm, 100mm, 150mm, and 210mm lenses. From a temporary studio, presentations were microwaved to the Fort Monmouth Master TV Control where they were transmitted via closed circuit to the classrooms. No intercommunication system was used between classroom and instructor; thus students could ask no questions.

Special effects such as superimposures, close-ups, and similar techniques were employed in varying degrees in all presentations. The instructor appeared before the cameras and gave his presentation from an outline in the same manner as he did his regular classroom instruction.

Little effort was made in this study to insert or explore the use of color beyond that normally found in Fort Monmouth instruction. There were a number of reasons for this approach. As a first study, it was thought more realistic to evaluate the two types of television based on instruction as normally found. To attempt to explore and extensively use color would produce an instructional situation not typical of military training. This latter procedure is thought of as more suitable for later studies on the effects of color upon learning and the possible development of principles and techniques for the improvement of teaching through the application of color. *This study avoided the latter approach and its findings must be interpreted in the light of the approach used: that is, injecting color largely as it is found in on-going conventional classroom instruction.*

Auditing of Instruction

Television instruction was audited in both the color and black-and-white classrooms in order to determine what transpired in the class-

room and also to ensure the complete transmission of the subject material.

Proctors were provided by each division in order to standardize the testing conditions.

Results

The major question under study was whether color or monochrome television produces any difference in learning. The results of this study provide no evidence that such a difference exists. Table 2 shows the average trainee test score for the 11 lessons in the two instruction situations.

TABLE 2—AVERAGE TRAINEE TEST SCORES [1] FOR THE ELEVEN LESSONS

Lesson	*No. Items*	*Monochrome TV Score*	*Color TV Score*	*Difference*
Foster Seely Discriminator	20	12.56	12.75	0.19
Phase Sensitive Rectifier	17	11.40	11.20	0.20
Complex Wave Analysis	20	15.05	14.54	0.51
Cathode Coupled Multivibrator	20	8.73	9.07	0.34
IF Amplifier	20	16.00	15.62	0.38
RF Amplifier	12	8.88	8.79	0.09
Automatic Range Tracking	15	5.80	7.50	1.70*
Signal Generator	18	13.07	13.18	0.11
Introduction to Color	16	8.54	7.21	1.33
Material for Copying	15	11.28	10.95	0.33
Film Characteristics	15	6.97	7.44	0.47
Over-all Mean [2]	188	118.28	118.25	.03

[1] Number of items right.
[2] Despite the unequal number of items on the different tests and unequal test variance, all tests were arbitrarily assigned equal weights.
* Significant at the .05 level.

Ten out of 11 comparisons show no significant difference between groups taught by monochrome and color television. The one significant comparison in favor of color, automatic Range Tracking, is considered unimportant in view of this over-all picture and the small differences in test performance.

Further analysis was made to see what differences, if any, were achieved by trainees of different aptitude. The groups were divided in half, based on aptitude scores, and separately analyzed. Table 3 presents the average scores achieved by these high and low aptitude groups.

There is a statistically significant difference in the performance of the high and low aptitude groups with respect to the type of television used.

The high aptitude groups learned better from monochrome television instruction; the low aptitude groups learned better from color television. However, for practical purposes, the differences achieved are considered too small to justify the use of color television. In addition, the important fact in this, as in previous studies, is that aptitude rather than type of television instruction predicted the amount of learning.

TABLE 3—HIGH AND LOW APTITUDE TRAINEE SCORES

Lesson	*Aptitude*	*Monochrome TV Score*	*Color TV Score*	*Difference*
Foster Seely Discriminator	High	13.25	13.25	0
	Low	11.88	12.25	.37 - c*
Phase Sensitive Rectifier	High	11.60	12.80	1.20 - c
	Low	11.20	9.60	1.60 - m**
Complex Wave Analysis	High	14.00	14.90	.90 - c
	Low	16.09	14.18	1.91 - m
Cathode Coupled Multivibrator	High	10.29	10.14	.15 - m
	Low	7.17	8.00	.83 - c
IF Amplifier	High	16.26	16.49	.23 - c
	Low	14.97	15.50	.53 - c
RF Amplifier	High	9.65	9.06	.59 - m
	Low	8.11	8.51	.40 - c
Automatic Range Tracking	High	7.10	8.10	1.00 - c
	Low	4.50	6.90	2.40 - c
Signal Generator	High	13.90	13.45	.45 - m
	Low	12.23	12.90	.67 - c
Introduction to Color	High	10.50	8.42	2.08 - m
	Low	6.58	6.00	.58 - m
Material for Copying	High	12.55	11.82	.73 - m
	Low	10.00	10.08	.08 - c
Film Characteristics	High	8.60	7.20	1.40 - m
	Low	5.33	7.67	2.34 - c
	High	127.70	125.63	2.07 - m
	Low	108.06	111.59	—3.53 - c

* difference favors color television trained groups.
** difference favors monochrome television trained groups.

Test Item Analyses

As described previously, an attempt was made to include test items where color seemed important as a prerequisite to answering the question correctly. Separate analysis was made of trainee performance on these and the non-color items under the two training conditions of the study. Table 4 presents this analysis.

This analysis provides no evidence of differences in performance on color or non-color test items. When added to the prior findings, the in-

dication of no important differences in learning produced by color and monochrome television instruction is strengthened.

TABLE 4—NUMBER OF CORRECT ANSWERS TO COLOR AND NON-COLOR TEST ITEMS BY TRAINEES IN THE MONOCHROME AND COLOR TELEVISION GROUPS

Trainees	*No. of Color Items Correct (Total 960)*	*No. of Non-Color Items Correct (Total 6963)*
Monochrome Television Group	499	3449
Color Television Group	461	3514
Differences*	38	65

* Not significant

Discussion

The general finding of no important differences in trainee learning was expected for those lessons where color played a minor role. What is of interest, however, is that this finding prevails where color on *a priori* grounds would seem important. In particular it would be expected that in those test items where color seemed critical—the reading of color coded electrical materials—the color television group would learn better. The investigators offer the following explanation: The color television group was able to see colors of equipment, charts, etc. The monochrome television group could not; what they saw were various shades of gray. But where color seemed important, the names of the color were inserted or referred to by the instructor. For example, in reading color coded resistors, monochrome television trainees would *hear* that the color red had a certain value but only see it as a shade of gray. It seems reasonable to assume that for this type of learning, *hearing* the association of a color and a particular value or function during training is adequate for later *seeing* this color and remembering its value or function. Or, put somewhat differently, for most people colors are sufficiently familiar so that words can substitute for them in many learning situations, and transfer can occur when color is used in the performance situation.

The finding of a relationship between trainee aptitude and performance under color and monochrome television instruction was not considered important enough to justify the use of color television under the conditions of this study. However, this finding probably merits further study in the area of instructional methods for different aptitude groups.

Little attempt was made under the conditions of the present study to exploit the use of color beyond that normally found in the instruction given at Fort Monmouth. Future studies attempting to use color as effectively as possible might find more important effects upon learning than in this study.

Conclusions

1. There was no significant difference between trainee learning produced by color or monochrome television instruction.

2. There was no significant difference in performance upon color and non-color test questions by the color and monochrome television trained groups.

3. There is suggestive evidence that high aptitude trainees learn better from monochrome television and low aptitude trainees learn better from color television. But the important factor in predicting amount of learning is trainee aptitude.

REFERENCES

1. Carpenter, C. R., and Greenhill, L. P. "Scientific Approach to Informational-Instructional Film Production and Utilization." *Journal of the Society of Motion Picture and Television Engineers* 58: 415-27; May 1952.

2. Jackson, R. *Learning from Kinescopes and Films.* Technical Report SDC-20-TV-1. Special Devices Center, Office of Naval Research, Human Engineering Department, Port Washington, New York; April 1952. 15 p.

3. VanderMeer, A. W. "Color vs Black and White in Instructional Films." *AV Communication Review* 2: 121-34; Spring 1954.

The Effect of Lighting Angle on the Judgment of Photographed Subjects

PERCY H. TANNENBAUM AND
JAMES A. FOSDICK

This study was conducted as part of the research program of the Mass Communications Research Center at the University of Wisconsin. Dr. Tannenbaum is director of MCRC; Mr. Fosdick is lecturer in journalism and a doctoral candidate in mass communications. For their help in conducting the projects, the authors are grateful to Gerald Cashman and Bradley Greenberg, graduate students in mass communications at the time the study was conducted.

DOES THE WAY in which a photograph is made (to use the professional photographer's term rather than the layman's "taken") influence the interpretation of the picture itself, or of its subject? To put it differently, does a photograph contain elements of *style,* as well as subject matter or content, which can limit or enhance the viewer's perceptions?

Some authorities—e.g., Spaulding (9) and Miller (5)—have suggested this to be the case, although research evidence has been lacking. In a statement intended to formalize a remark which largely motivated the present study, Gerbner said:

> There are objective built-in elements (such as camera angle, lighting, juxtapositions, contexts, relative size, etc.) which form part of the basis along which pictures are perceived. We are not always aware of the existence, or nature, of these more subtle elements . . . Manipulation of these elements can, therefore, lead to changes of perception (meaning) with relatively little awareness of manipulation.*

The problem posed here is similar to that involved in the notion of an *indexing process* in communication effects (10). In any communication situation, there are a host of possible ways in which the

* In a personal communication to the senior author, July 24, 1959.

communicator can structure or encode his message. Some of these are a function of the encoder himself; others are a function of the selected communication channel. Similarly, some may be deliberately selected by the encoder; others may occur without his awareness.

Either way, such *encoding decisions* are manifested in the result of his encoding behavior—in the message. As such, they become integral parts of the stimulus to which the receiver is exposed. A legitimate problem for research is whether such indices in the message stimulus exercise an effect on how the message is decoded—what meaning it has for the receiver, or how he perceives it.

The present paper reports on an experimental investigation of the influence of one such possible index, the *lighting angle* involved in communication through photographs. Among the many working assumptions and rules of thumb employed by photographers is the notion that lighting angle is an effective technique in their encoding tool kit. For example, it has long been felt that a single light directed at a human subject from below and in front can lead to an unfavorable judgment of that individual.

In the present study, we sought to investigate experimentally the effect of lighting angle on the judgment of a human model as shown in a photograph. That is, we were not concerned with the judgment of the photograph *per se,* but with the subject of the picture. The null hypothesis tested was that no difference exists in the judgment of the model as a result of varying positions of light source. In effect, we did expect to find some differences, particularly in the *evaluation* of the model. More specifically, we expected to find a significantly less favorable perception of the subject when the lighting angle was from below.

From a purely methodological standpoint, this investigation represents one of the few instances of the use of controlled experimentation in research on pictorial communication. For the most part, work in this area has been limited to studies of readership and interest—such as those by Willem (11), Woodburn (12), MacLean and Hazard (3), etc. Among the few experimental studies are those by Kerrick (2) on the meaning of changes resulting from combining pictures with varying captions, and by Mehling (4) on the effect of combining newsstories with photographs. The present research is methodologically similar to the latter two, except that it focuses upon an independent variable involved in the encoding of a purely pictorial message. As such, it may help set the stage for similar experimental studies of the effects of dif-

ferent stylistic factors, as called for by Spaulding (9) and Miller (5), among others.

METHOD AND PROCEDURE

For purposes of the present study and because of limitations of time and facilities, it was decided to restrict the variations of lighting angle to four. Similarly, four different models, varying in sex and age, were used.

Preparation of Stimulus Material

One of the authors (Fosdick), an experienced photojournalist, photographed the four models, each under four different lighting conditions. The models were a young woman *(A)*, an older man *(B)*, an older woman *(C)*, and a young man *(D)*. The four lighting angle conditions were: below *(a)*, flat *(b)* with the light at the camera, above *(c)*, and at a 45° lateral angle to the camera-subject axis *(d)*. Figure I illustrates the respective positions of the single photoflood lamp used to achieve these lighting angles.

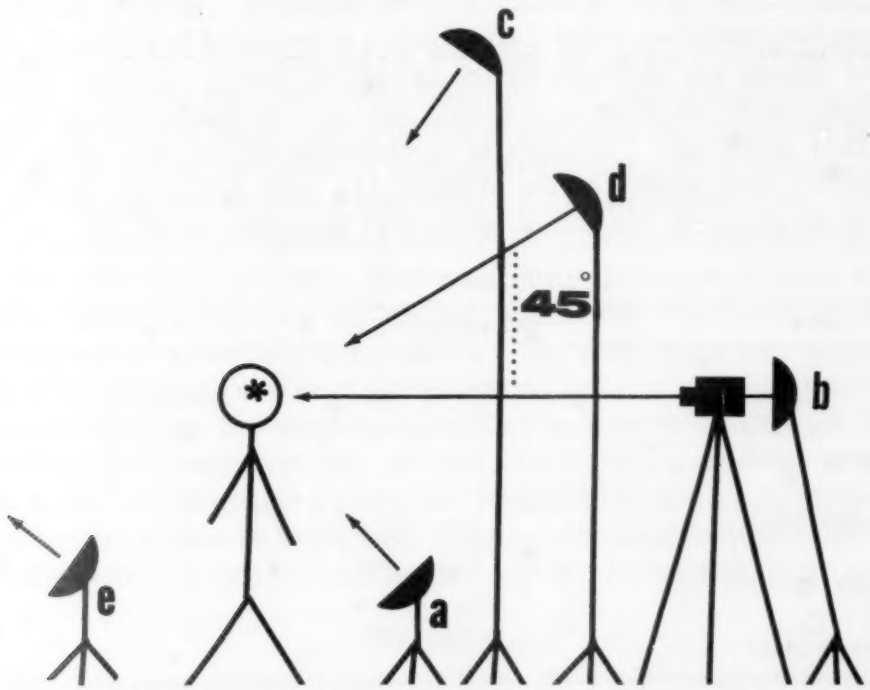

FIGURE I. *Respective positions of a single photoflood lamp to achieve different lighting angles.*

In each case, the light was kept at the same distance from the model in order to secure equal exposures. A plain background was illuminated by a single photoflood *(e)* in all cases to insure normal tone separation between model and background. The models took pains to maintain a consistency of expression and pose under the different lighting conditions. The photographer used a twin-lens reflex camera (Rolleicord V) mounted on a tripod, because it was felt that the continuous ground glass viewing would make it easier to secure uniformity. In all cases, the models were seated.

Black and white prints were made from the negatives, with special care taken to insure uniformity in contrast and tone. Two-by-two slides were prepared from the prints—four versions of each of the four subjects, or 16 slides in all. (By contacting the authors, interested readers may obtain copies of the prints.)

Experimental Design

These 16 slides constituted the actual stimulus materials for obtaining the judgments of the models in the experiment. The basic design for these judgments was a 4x4 Latin Square, as indicated in Figure II. The four models are identified by the capitalized letters, the four lighting conditions by the lower-case letters, and the four testing groups by the Roman numerals. The order of presentation within each group was constant with respect to the models—i.e., each group was presented with its particular version of model *(A)* first, then model *(B)*, etc. In

MODEL	LIGHTING ANGLE			
	a below	b flat	c above	d 45°
A (young woman)	I	II	III	IV
B (older man)	III	I	IV	II
C (older woman)	II	IV	I	III
D (young man)	IV	III	II	I

FIGURE II. *Experimental Design.*

this manner, each group was exposed to four pictures—one and only one of each model, and one and only one of each version.

Testing Procedure

Four sections of an undergraduate sociology course served as subjects for the experiment. Since the analysis of the data necessitated an equal *n* per cell, the groups were reduced at random to that with the smallest *n*, which turned out to be 15.

The slides were presented via a standard automatic slide projector. The room was maintained in a constant semi-darkened state, and a beaded screen was used to insure a clear, sharp image. The same room was used for all four groups, which were tested on consecutive days.

The subjects were told to look at the projected picture and were asked to rate the subject or model—and not the picture as such—on a set of 12 bi-polar scales of the semantic differential (8). It was felt that this technique was particularly well suited to the purposes of this experiment. Many of its applications in the past have been in similar experimental settings, and it has been demonstrated to possess most of the necessary attributes we expect for any measurement device in this field.

The 12 scales were selected on the basis of earlier factor analysis work to represent the three main dimensions of connotative meaning. There was an inordinate representation of scales for the evaluative factor because we felt this basically attitudinal dimension to be most sensitive to the experimental treatment. The 12 scales included seven from the *evaluation factor* (good-bad, happy-sad, pleasant-unpleasant, honest-dishonest, guilty-innocent, kind-cruel, dirty-clean); three from the *activity factor* (active-passive, slow-fast, warm-cool); and two from the *potency factor* (heavy-light, soft-hard). The scale order was rotated both with respect to sequence and polarity.

In this manner, the subjects made their judgments of each of the models in their respective four pictures. Each picture was left on the screen until all subjects in a group had completed their 12 ratings; then a subsequent picture was projected. Testing proceeded without trouble, with an average of less than 15 minutes required for each group.

RESULTS

The data gathered were analyzed both on an individual scale basis and in terms of factor scores. In both cases, a Latin Square analysis

of variance was conducted. Such an analysis allows for a test not only of the main variable under consideration—differences in judgment due to the different lighting conditions—but also other variables included in the design. Since the factor data better summarizes the main findings, we will focus our description of the results upon them.

Table 1 summarizes the results of the analysis of variance for the three main factors. We can readily see that there is a significant between-model difference on all three factors—not a totally unexpected finding considering the selection of these models. There is a significant difference between lighting angles only on the evaluative factor. Although the difference on activity and potency are fairly substantial, they fail to meet the criterion of statistical significance. It is of some interest to note that in all cases, the between-group difference is fairly minimal, which helps confirm the basis of group matching for purposes of this study.

TABLE 1—RESULTS OF ANALYSIS OF VARIANCE FOR THREE FACTORS

Source of Variance	*df*	*Evaluation Mean Square*	*F*	*Activity Mean Square*	*F*	*Potency Mean Square*	*F*
Between Models	3	101.50	15.85***	76.47	28.74***	45.42	24.14***
Between Lighting Angles	3	24.86	3.89**	6.46	2.42	3.86	2.05
Between Groups	3	1.90	.30	4.71	1.77	3.05	1.62
Triple Interaction	6						
Double Interaction* (M x L)	9	6.40	2.79***	4.02	1.51	2.83	1.52
Within Cells	224	2.29		2.65		1.86	
TOTAL	239						

* Double Interaction is found by summing across the Between-Groups and Triple Interaction terms.
** $p < .05$.
*** $p < .01$.

Evaluation

It was with this dimension of judgment, highly similar to the general notion of attitude, that we were mainly concerned. Here we find significant differences between models, between lighting angles, and also in the model-by-lighting angle interaction.

Regarding the between-model difference, the data show model *C* (older woman) being the most favored by far. The other three models

trailed somewhat in general evaluation, with model *B* (older man) being judged the least favorable.

The significant between-lighting-angle difference provides some verification of the main hypothesis, at least with respect to evaluation. However, closer scrutiny of the data reveals that the obtained significant difference is due mainly to the fact that lighting condition *d* (45° side angle) generally makes the model appear to be more favorable than under any of the other conditions. There are no significant differences among the remaining three lighting variations. The original suspicion that lighting from below (condition *a*) would create an unfavorable judgment proved to be unfounded—at least it was not found with any consistency across the different models.

It is this relative lack of consistency of effect of the lighting angle across models that contributes to the significant interaction obtained. What this indicates is that a particular lighting condition produces a certain effect, but the effect obtained differs among models. There appears to be a special kind of "going-togetherness" between models and lighting angles.

Activity

On this factor, the only significant difference beyond the usually accepted 5 percent level was the between-model variance. Interestingly, model *D* (young man) emerges as the most active, but model *A* (young woman) is judged the least active. Generally, activity here appears to be more a function of sex rather than age—the two men are judged significantly more active than the two women, but there is no significant difference when the groupings are by age.

The between-lighting-angle difference falls just short of the 5 percent level ($p = .075$ approximately), but is fairly substantial nevertheless. Closer scrutiny of these data suggests that the only possible pair difference is between conditions *d* and *c*—the 45° angle emerges as producing the most active judgment, and the above lighting angle producing the least active, with the remaining conditions occupying an in-between role.

Potency

On this dimension of judgment, none of the variances are significant to any degree, save for that between models. Here again, we find the

main factor causing the difference to be one of sex—the older man and younger man are judged much more potent than the two women, with model *B* being judged the strongest.

The differences across the four lighting conditions are fairly minimal on this factor. About the only suggestion contained in the data is that the 45° angle (condition *d*) elicits a somewhat less potent judgment, although not significantly so. The three other conditions are essentially identical.

DISCUSSION

The results of this investigation indicate that lighting angle, as one of the encoding variables involved in photographic communication, can influence some of the connotative judgments of the photographed models. Its effect is most apparent on the evaluative factor of connotative meaning, somewhat less so on activity, and is practically negligible on the potency dimension.

However, such possible differential effects of lighting angle do not apply equally to all variations of lighting. In this investigation at least, the most noticeable effect was that of the 45° angle condition. It stood out from the three other angles used by producing more consistently pronounced effects on all three factors, with the remaining conditions showing relatively little variation from one to another.

This finding with regard to the 45° angle condition is perhaps not too surprising when we consider the commentary of several of the leading writers on photographic lighting. For example, the so-called Triangle Lighting plan devised by Don Mohler (7) is based on having the main light at a 45° angle to the camera-subject axis. Similarly, Miller and Brummitt (6), in describing the "art of lighting," suggest this lighting angle as a first-priority consideration. Carroll (1) puts it this way:

> The 45° light is the most generally useful of all types of light, offering as it does maximum modeling and delineation of features. . . . [Generally] it will produce the greatest percentage of good, natural, pleasing portraits.

Perhaps the most surprising finding in connection with the different lighting angles in this study was that lighting from below failed to produce any consistent differentiation in judgment of the model. Only on evaluation, where it was expected to produce a very unfavorable reaction, and only when compared with the 45° condition, did it evoke a more negative judgment. That such a finding may disagree with

some previously-held assumptions only suggests the extreme need for further research of this type.

This is not to suggest that in any replication of the present study would the findings related to the below-lighting condition necessarily remain the same. There is always a risk in generalizing from such experimental investigations—in this case even more so. One must always keep in mind the specific kinds of models used and their poses and expressions, especially in light of the significant model-lighting interaction obtained. Similarly, the specific context in which the photographs are taken and displayed may produce different results. All we can say at present is that these were the results obtained in this context, with these models, and with this specific measurement device. Generalization from such findings must await replication under somewhat different conditions.

There are many other possible encoding variables involved in making photographs that can be investigated in similar experimental settings. Perhaps the really critical variable in the present study was not so much lighting angle *per se* as it was *lighting key*—the over-all tone (light, normal, or dark) of the photograph. This latter dimension was not completely independent of our main variable, and therefore may have been a contributing—or possibly a contaminating—factor in the findings. In any event, lighting key is probably a significant factor in the encoding and decoding of photographs and, as such, deserves detailed study. Similarly, such additional variables as camera angle, background tone, degree of detail or sharpness, control of perspective, etc., should be explored under rigorous conditions with adequate controls. It should be clear that our interest in such factors would not be concerned only with the single variable but also with the interactive effect of several variables operating within the same context. How they blend to influence a single judgment may well be the most significant factor in understanding how photographs are made and how they are read or perceived.

REFERENCES

1. Carroll, John S. "How to Use Light." *Graphic Graflex Photography*. Tenth edition. (Edited by Willard D. Morgan and H. M. Lester.) New York: Morgan and Lester, 1954.

2. Kerrick, Jean S. "News Pictures, Captions and the Point of Resolution." *Journalism Quarterly* 36: 183-88; Spring 1959.

3. MacLean, Malcolm S., Jr., and Hazard, William R. "Women's Interest in Pictures: The Badger Village Study." *Journalism Quarterly* 30: 139-62; Spring 1953.

4. Mehling, Reuben. "Attitude Changing Effect of News and Photo Combinations." *Journalism Quarterly* 36: 189-98; Spring 1959.

5. Miller, Neal, and others. *Graphic Communication and the Crisis in Education.* Washington, D. C.: Department of Audiovisual Instruction, NEA (Published as Vol. 5, No. 3 of *AV Communication Review*), 1957.

6. Miller, Thomas H., and Brummitt, Wyatt. *This is Photography.* New York: Garden City, 1952.

7. Mohler, Don. "Multiple Flash in Press Photography." *The Complete Book of Press Photography.* (Edited by Joseph Costa.) New York: National Press Photographers Association, 1950.

8. Osgood, Charles E.; Suci, George J.; and Tannenbaum, Percy H. *The Measurement of Meaning.* Urbana: University of Illinois Press, 1957.

9. Spaulding, Seth. "Research on Pictorial Illustration." *AV Communication Review* 3: 35-45; Winter 1955.

10. Tannenbaum, Percy H. "The Indexing Process in Communication." *Public Opinion Quarterly* 19: 292-302; Fall 1955.

11. Willem, Jack. "Reader Interest in News Pictures." *Graphic Graflex Photography.* Eighth edition, revised. (Edited by Willard D. Morgan and H. M. Lester.) New York: Morgan and Lester, 1947.

12. Woodburn, Bert W. "Reader Interest in News Pictures." *Journalism Quarterly* 24: 197-201; Spring 1947.

Predicting Learning, Attitude Shift, and Skill Improvement from a Traffic Safety Film

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This investigation was supported by Research Grant RG-5786 from the Division of General Medical Sciences, Public Health Service, U. S. Department of Health, Education and Welfare to Michigan State University and conducted under the joint auspices of the Audiovisual Center and the Highway Traffic Center of the University.

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THE GENERAL PURPOSE of the research reported here was to test the reliability and validity of behavorial and factual analysis. A description of the rationale and technique of this procedure by Twyford and others was reported earlier in this journal (7).

Behavioral and factual analysis may be described as a procedure according to which the analyst enumerates in detail the message elements within a motion picture (both pictorial and verbal), classifies them, and then predicts for one classification with respect to a specified audience the learning, attitude shift, and skill improvement resulting therefrom.

As reported in the previous article, the development of behavioral and factual analysis was based upon the premise that a need exists

for an improved method of predicting the effects of a film, a method which has validity and can be performed inexpensively in far less time than is now required through formal procedures involving experimental subjects. Underlying the development of behavioral and factual analysis are the following assumptions: (a) only those message elements which can be phrased in the imperative (e.g., turn your front wheels into a skid) are potentially "actionable," and hence can possibly lead to behavior change (7:185-7); (b) the extent of prior knowledge of the specific audience is related to the change in behavior possible (i.e., the less prior knowledge the greater room for improvement) (7:188); (c) the environment of the specific audience affects adoption of behavior advocated in the motion picture (7:187); and (d) an individual generally recognized as an expert in this field is able to make accurate judgments as to which message elements are actionable, the amount of prior knowledge of a specific audience, and the effects of the environment upon a course of action advocated (7:190).

Several problems were considered during the planning phase of the research reported here. Is an educational film production background of greater value to the analyst than a background in traffic safety? Film production experience might be expected to leave the analyst more expert in evaluating the film statement of the message element, while a background in traffic safety might well leave him better versed as to the prior knowledge of the specific audience and the effect of the environment upon driving behavior. In other words, which of these two kinds of experts can best perform behavioral and factual analysis?

Another problem concerns the success of this procedure at its several stages. In effect, the analyst, following identification of actionable message elements, first estimates the learning to be expected, drawing upon his judgment of the prior knowledge of the audience. Then he estimates the amount of attitude shift associated with the increase in learning, and finally, in the light of these predictions, he estimates improvement in skill and performance as influenced by the "facts of life" within the environment of the specific audience (7:187). It is possible that the procedure may be successful in obtaining accurate predictions of learning, for example, but may fall short of success where predictions of attitude shift and skill improvement are involved. The experimental design should make possible identification of the relative adequacy of a procedure at these various stages.

Still another problem was related to the effectiveness of the procedure

in making long-term predictions. Would the procedure assist the analyst in making accurate predictions of learning that occurred while viewing? Would it assist in making accurate predictions of the amount of learning retained after six weeks? The amount of learned material retained declines with passage of time. On the other hand, attitudes may shift to a more favorable position after an interval of nine weeks (2:182-200). Skill improvement and performance are considered related to both attitude change and learning. With respect to the situation immediately following viewing a film, what happens to "permanent" skill improvement after retention has declined but attitude may have shifted to a more favorable position?

The problem of measurement of behavior received attention. The very act of measuring the behavior of the subjects might be expected to create conditions dissimilar to the actual driving situation. Hence, it was decided to substitute predictions of skill improvement in the experimental situation, with the provision that the performance measure be conducted under conditions resembling the normal driving situation as closely as possible.

As a result of these considerations during the planning phase, it was decided to establish four research objectives, i.e., to find the answers to the following questions:

1. Which are more successful in conducting behavioral and factual analysis: subject matter specialists or specialists in the production of instructional films?
2. Does behavioral and factual analysis procedure result in successful predictions of learning, attitude shift, and skill improvement?
3. Does current behavioral and factual analysis procedure result in successful immediate and permanent predictions?
4. What was the actual immediate and permanent effect of the experimental film stimulus upon the specific audience tested?

For a complete statement of this problem, the methodology, results, and discussion, see McAshan (4).

METHOD

The experiment was designed so that a panel of film production experts and a panel of traffic safety experts each completed the behavioral and factual analysis procedure to produce predictions of learning, attitude shift, and skill improvement. These predictions were

compared with each other, and with the actual performance of the specific audience.

The enumeration and classification of message elements were completed prior to the experiment by one of the authors in order to standardize this step for both panels. Both panels were assembled at a single location, and the procedure was explained. A trial analysis of several message elements was performed until the panel members were satisfied they understood the procedure to be followed. After this the test film was exhibited, and each member of both panels completed the behavioral and factual analysis individually.

The specific audience for which the predictions by the analysts were made had been recruited prior to the meeting, and the nature of that audience described to the panels. This audience was subsequently divided in a random fashion into four groups. On the scheduled evening two groups viewed a non-related film, and two groups viewed the test film. One control (non-related film) and one experimental group were excused, with instructions to return on a specified evening six weeks in the future. The two groups remaining were given identical tests for attitude shift, learning, and driving skill. Upon agreement that they would not divulge the contents of the examination until the experiment was finally completed, they were excused. At the specified date six weeks later the other control and experimental group were given identical tests.

It was assumed that the scores of the two control groups who were shown the non-related film represented the prior knowledge, attitude, and driving skill of the specific audience. Improvements or shift were assumed to be the difference in scores between experimental and control groups (3:256).

All subjects of the experiment were from Michigan State University. The panel of film production experts consisted of five members of the Audiovisual Center staff experienced in instructional film production. The panel of subject matter specialists consisted of five members of the staff of the Highway Traffic Safety Center. The specific audience for which each panel member made his predictions consisted of 165 sophomore, junior, and senior students who had driver's licenses and one year or more of driving experience.

Only one test film was used in this experiment. A summary of instructional film research indicates there is a wide range of effectiveness with which different points are conveyed by one film (3:311).

Enumeration of message elements provided behavioral and factual analysis predictions on 40 items to be learned from viewing the film. There were fewer specific attitudes which required a separate prediction, and also fewer skills which demanded a separate prediction as to improvement.

Test Material New to Students

The film selected was *Driving at Night,* a 15-minute black and white sound motion picture produced by Jervis B. McMechan for the Ford Motor Company and distributed by Ford and the Michigan State University Audiovisual Center. The subject of driving at night is not generally taught during practice driving sessions in high school driver education courses in Michigan. Thus, it was a subject in which prior knowledge of the specific audience might be sufficiently incomplete to allow for potential skill improvement. This film is recognized among driver education instructors and film production experts as one of high quality; hence its exhibition could not be expected to be harmful to any of the experimental subjects.

The test of learning had been refined from a longer pilot version by means of item analysis. It was a multiple-choice examination offering four choices on each of 40 items.

The type of attitude test administered employed four scales taken from the evaluative factor of the semantic differential (6). Based upon a separate analysis of the motion picture content, an analysis approved by the producer of the film, six specific concepts not all of equal importance, and one central concept were selected for measurement. The semantic differential provided a scale by which the shift in attitude of the specific audience toward each of these concepts might be measured.

In contrast to the pencil-and-paper test of learning and attitude shift, the test of driving skill was one of performance, designed to come as closely as possible to actual driving conditions. Subjects in the specific audience were informed that they would be given a night driving test on the MSU automobile driving range, a paved practice area marked off for use in driver education classes. The three tests administered at the range were designed to give an estimate of driving skill in general, an estimate not related to the specific skills in night driving presented in the test film. The actual test of the specific skills was given each subject individually *on the way to the driving range,* during which nine

situations presented in the test film were actually encountered by the subject. To disguise the nature of the actual test each subject was informed by the driver education instructor who accompanied him that an indirect route to the driving range was taken to allow him to gain some familiarity and ease in operating the motor vehicle before the night driving test was administered. It was the opinion of the instructors who accompanied the students that this device was successful in almost all cases.

The average estimate of the traffic safety panel on each of the 40 items was correlated with that of the film production panel to determine the agreement in predictions of learning between the two panels. The average estimate of each panel was correlated with the difference scores of the specific audience to determine the success of the panel's predictions. The two panels were combined into a composite panel for an additional comparison with the specific audience (8:233). The test for independence of the two variables was the test statistic "t" with $\alpha = .05$ (8:241).

The six specific concepts plus a central concept were analyzed according to a procedure devised by one of the authors for analyzing the impact of an educational television series. For each of the concepts the desired direction of shift was determined from the separate analysis of film content (5:5-15).

Homogeneity of variance between the matched groups was tested to determine if each group of the specific audience could be assumed to have come from the same population (8:186). Analysis of variance in general driving skill scores among the four groups of the specific audience was computed to determine whether the random assignment of subjects resulted in groups of equal general driving skill (8:212).

For the purposes of testing behavioral and factual analysis, the success of the film in terms of the producer's objectives in producing learning, attitude shift, or improved driving skill was a matter of indifference. Had the film been a total failure or complete success *and had the panel so predicted,* the data would have supported the value of this procedure to the same degree. However, it was considered injudicious to ignore such evidence, because our knowledge of film effects is as yet incomplete. How this evidence was to be presented, posed the final problem to be considered.

It is generally held that effective use of the teaching film involves preparation of the students to view the film and careful follow-up

(9:404). There is strong reason to suspect, however, that the success of these utilization techniques depends upon the competence of the teacher employing them (3:317). The latter consideration indicated that the test of behavioral and factual analysis be based upon the effects of the film only and not on estimates also of teacher effectiveness in utilization. This meant, however, that gains in learning, attitude shift, and driving skill reported as film effects do not include those additional gains assumed to come from utilization techniques.

RESULTS

Comparison of Panels and Specific Audience

For the sake of brevity, the comparisons required by the problem are presented in a single table, which shows the correlations for each of the tests under each condition of test. The correlation compares the responses of each group to the 40 items on the test of learning, the seven concepts of the semantic differential attitude test, and the nine items of the driving skill test.

TABLE 1—COEFFICIENTS OF LINEAR CORRELATION* AND t-VALUES OF SIGNIFICANCE FOR ALL COMPONENTS OF THE BEHAVIORAL ANALYSIS

Component	r_{12}	t	r_{14}	t	r_{24}	t	r_{34}	t
Immediate Learning	.52	$t_{.01}$	.22	$t_{.10}$	.43	$t_{.01}$	.36	$t_{.05}$
Permanent Learning	.29	$t_{.10}$	.26	$t_{.10}$	.35	$t_{.05}$	.48	$t_{.01}$
Immediate Attitude Change	.93	$t_{.01}$	.30	$t_{.10+}$	.36	$t_{.10+}$	.34	$t_{.10+}$
Permanent Attitude Change	.78	$t_{.05}$	.06	$t_{.10+}$	.12	$t_{.10+}$	.09	$t_{.10+}$
Immediate Skill Change	−.21	$t_{.43}$	.61	$t_{.10}$	−.05	$t_{.40}$	.39	$t_{.50}$
Permanent Skill Change	−.21	$t_{.50}$	.11	$t_{.50}$	−.56	$t_{.10}$	−.38	$t_{.40}$

* r_{12} = Traffic Safety Predictions vs. Audiovisual Predictions
r_{14} = Traffic Safety Predictions vs. Audience Scores
r_{24} = Audiovisual Predictions vs. Audience Scores
r_{34} = Combined Group (TS and AV) Predictions vs. Audience Scores

Table 1 indicates that, using a t-value with a level of statistical significance of .05, the predictions of the panels of subject-matter and film production specialists were in greater agreement than could be expected from chance alone on the particular message elements in which greater or lesser learning immediately after viewing was predicted. They also agreed to a remarkably high degree in their predictions of which message elements were expected to produce attitude shift immediately after viewing and also six weeks later.

Panel success was considered to be the same better-than-chance correlation between prediction and specific audience score on each item of the various tests. Predictions of the subject-matter specialists fell short of the criterion on all tests. The predictions of the film production specialists were significantly better than chance on both immediate and "permanent" (after six weeks) learning; short of the criterion on immediate and permanent attitude shift; and still further from the criterion on the tests of driving skill improvement. When the judgments of the two panels were combined, the composite panel was as successful in its judgments as were the film production specialists alone.

Film Effects

The specific audience score (with a possible 40) for immediate learning was a mean of 22 for the control group and 29 for the experimental group, or an assumed gain of seven points. Under the condition of test after six weeks, the mean score for the control group was 23 and the experimental group 26, or an assumed gain of three points. Both gains exceeded chance at the .05 level of statistical significance.

The test of variance between the matched groups for the achievement, attitude, and driving performance tests indicated "F" values so small as to reflect chance variation only. All values failed to reach the .05 level of statistical significance. Therefore, all groups could be assumed to have come from the same population.

No shift in attitude toward the central concept of the test film was revealed, either immediately after viewing, or six weeks later. No shift in attitude toward the six specific concepts in Table 2 was observed immediately after viewing. However, on the test administered six weeks after showing the film, attitudes toward the concepts *night driving skill* and *night driving fatigue* both shifted in the desired direction

TABLE 2—SHIFT OF CONCEPTS IN DESIRED DIRECTION ON MEAN OF FOUR SCALES ON EVALUATIVE FACTOR OF SEMANTIC DIFFERENTIAL

	Conditions of Test			
	Immediate		*Permanent* [a]	
	Shift	*t-test*	*Shift*	*t-test*
Specific Concepts				
Night Driving Skill	+.225		+.750	[b]
Headlight Limitations	+.002		+.123	
Night Driving Visibility	+.178		+.131	
Night Driving Fatigue	+.183		+.734	[b]
Proper Headlight Use	+.170		+.108	
Pedestrians	+.228		+.094	
Central Concept				
Driving at Night	+.076		+.021	

[a] Test administered six weeks after film showing
[b] "t"—value of .05 level of statistical significance

a distance beyond that required at the .05 level of statistical significance. They were therefore labeled key concepts of the film.

No gains were reported in driving skill on any of the items included in the road test—neither for those subjects tested immediately after viewing nor for those tested after six weeks.

Each of the four groups was subdivided according to the number of skilled and normal drivers, and an analysis of variance was performed upon the resulting eight groups in order to determine if prior skill was interacting with type of film shown and time of test administration. The F-test revealed no statistically significant difference between the variances of the eight groups.

DISCUSSION

When the predictions of the panels of subject-matter and film production specialists are compared, several factors appear pertinent. One is their high agreement in prediction as to immediate learning and immediate and permanent attitude shift, and their lack of agreement as to improvement in particular items of driving skill.

The second is the failure of both panels to predict successfully the actual changes in attitude and improvement in driving skill, as reflected in the test scores of the specific audience. The third is the equal success of the composite panel with the film production specialist panel in predicting learning under the conditions of both immediate test and after six weeks.

There appears to be little real difference, based upon this evidence, in the ability of subject-matter and film production specialists to employ behavioral and factual analysis successfully in regard to a traffic safety film. However, the latter panel was technically superior in its predictions of learning, because it did significantly better than chance, statistically, in both the immediate and permanent judgments, while the former did so in neither.

Turning to the instrument itself, it is apparent that the behavioral and factual analysis procedure is most successful in its present stage of development in facilitating predictions of learning. The present data do not indicate that it is successful in predicting attitude shift or improvement in driving skill. The unanimity of the two panels in their predictions of attitude shift is unusual, particularly in view of the fact that such predictions were incorrect. Re-examination of the data indicated that both panels would have had judgments that correlated far more closely with actual learning and actual attitude shift had not four of the 40 learning predictions been in maximum error. Both panels, surprisingly, made identical mistakes on these same items, predicting much learning for two in which no learning occurred, and predicting no learning for two in which much learning occurred. These items were re-analyzed in the film, to recheck enumeration and classification. No reasons for restatement of the message element could be found. Film production techniques involving these items were analyzed for differences from other message elements in the film; none were identified. No hypothesis could be generated which might account for the fact that both panels made predictions in maximum error about the same four, and only these four, message elements.

That behavioral and factual analysis makes possible a better than chance prediction of learning is considered of importance, particularly in view of the previous findings that even good quality instructional motion pictures now on the market vary widely in effectiveness from topic to topic within the film presentation. Because the test film used in this experiment was of the skills type, this analysis provides little information as to the applicability of behavioral and factual analysis to the attitude film. Hypotheses may come for refining the analysis procedure from further investigation of other film types.

It is clear that the specific audience did learn from the experimental film. It is also clear that attitudes toward the key concepts were changed after a period of six weeks under conditions described as the

sleeper effect. The movement of two of the specific concepts cannot be attributed to chance alone, and must be considered as representing an over-all shift in attitude attributable to the film. Further confidence in the data comes from the fact that the film accounted for statistically significant shifts in opposite directions. The desired direction of shift of the concept *night driving skill* was toward the more favorable end of the scale (that of goodness, wisdom, and safety) while the desired direction of shift for *night driving fatigue* was toward the less favorable end (that of badness, foolishness, and danger). It is noted again that this shift in attitude resulted from a single viewing of what driver education instructors regard as a skills film.

No measurable improvement in night driving skill resulted from a single showing of this film. Other studies, plus internal evidence, suggest that no skills were learned. Learning skills from films is thought to take place through mental practice, which is primarily implicit or covert and only occasionally involves slight imitative movements of fingers or arms (3:172). The Harby study indicates that mental practice alone was not successful in producing an improvement in a motor skill until a two-minute film loop demonstrating a single skill had been repeated seven times on each of 14 different occasions (1). In the face of this evidence it would have been surprising indeed had this 15-minute film resulted in improvement in nine different skills from mental practice accomplished during a single film showing. This interpretation is strengthened by the findings of this study that learning of information took place and attitudes were shifted. Had failure to show skill improvement been due to the conflicting forces of the environment of the specific audience, attitude change in the desired direction after six weeks would not have been expected.

REFERENCES

1. Harby, S. F. "Comparison of Mental Practice and Physical Practice in the Learning of Physical Skills." *Instructional Film Research,* NAVEXOS P-1220. Special Devices Center, Port Washington, New York; January 1953.

2. Hovland, Carl I.; Lumsdaine, Arthur A.; and Sheffield, F. D. *Experiments on Mass Communication.* New Jersey: Princeton University Press, 1949.

3. May, Mark A., and Lumsdaine, Arthur A. *Learning from Films.* New Haven: Yale University Press, 1958. 357 p.

4. McAshan, Hildreth H. *An Experimental Study of Traffic Safety Films, The Factors Involved in Determining Driver Behavior, and the Predictive Effects of a Behav-*

ioral Change Analysis. Doctor's thesis. East Lansing: Michigan State University, 1960.

5. Merrill, Irving R. "The Impact of an Educational Television Series." *WKAR-TV Research Report 573M.* East Lansing: Department of Television Development, Michigan State University; April 1958. (mimeo).
6. Osgood, Charles E.; Suci, George J.; and Tannenbaum, Percy H. *The Measurement of Meaning.* Urbana: University of Illinois Press, 1957.
7. Twyford, Loran C., and others. "Behavioral and Factual Analysis." *AV Communication Review* 7: 182-92; Summer 1959.
8. Walker, Helen, and Lev, Joseph. *Statistical Inference.* New York: Henry Holt & Co., 1954. 510 p.
9. Wittich, Walter A., and Schuller, Charles F. *Audio-Visual Materials.* Second edition. Harper & Brothers, 1957. 570 p.

Retention of Subject Matter in Televised Biology

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THE MOST COMMON CRITERION for judging televised instruction has been the scoring on achievement tests administered immediately after the experimental period. Comparisons of such results with achievement in conventional classrooms have revealed, to the greatest extent, no significant differences between the two methods of instruction. It may be hypothesized, however, that instruction by television can result in higher retention than conventional instruction.

Partially because of the relative recency with which television has been used in instruction and partially because of neglect by researchers, the question of retention has been studied only to a small extent in relation to its importance.

Although no long-term retention studies have been made with television, Paul and Ogilvie (5) conducted a follow-up of Canadian students eight months after a telecourse. Their findings indicated that forgetting was proportionate to the amount learned and independent of the method by which the information was gained. Two investigators who found initial post-experimental differences between television and non-television groups discovered upon follow-up testing that the initial differences were erased. These investigators were Boone (1) working

with Naval Academy students in two electrical classes who were tested six weeks after the experiment, and Ulrich (6) who worked with eighth grade pupils allowing a 30-day time lapse before measuring retention. Parsons (4) tested students in his child psychology class and found that there were no initial significant differences and, after a four-month period, no significant differences between the television method and two other methods used in his study.

Purpose

The purpose of this study was to determine whether significant differences exist in the amount of biology subject matter retained by pupils taught by television and those taught in the conventional manner.

Methodology

During the 1957-58 school year, 180 pupils in six classes were taught biology by television while another 180 pupils in six other biology classes were taught in the conventional manner. The experimental classes were given television instruction every other day for a full 50-minute period and received conventional instruction on non-television days. The classroom teachers of the experimental classes never viewed the telecasts, since they were simultaneously engaged in teaching control classes.

Comparison of the television and non-television groups in terms of achievement on the Cooperative Biology Test administered at the end of the school year revealed that the television method was equally as effective as the conventional method for pupils of below average and average ability, while the television method was significantly superior for pupils of above average ability (2).

In March 1960, the pupils participating in the 1957-58 experiment were given an alternate form of the Cooperative Biology Test administered as a post-test one year and ten months earlier. In the intervening time some of these students had pursued other science courses; the others had not. In addition, many of the pupils had changed schools because of their transition from the ninth to the tenth grade. Eight of the 12 classes were located in schools in which the junior and senior high schools were combined, while the remaining four classes were located in independent junior high schools where pupils transfer to senior high schools at the end of the ninth grade. Many other students in the

original study were unavailable for follow-up testing because of absence or movement out of the school district.

Because of the obvious importance of the number of science courses taken in addition to biology, both television and non-television students were subgrouped on this basis. Since the concern of this study rests on the amount of retention of subject matter after a lapse of one year and 10 months, the type of analysis selected was that using covariance techniques resulting in an adjustment of follow-up scores in relation to the achievement at the end of the 1957-58 study. Three such covariance analyses were made: one for groups who pursued no further science courses, one for groups pursuing one other science course, and one for those taking two other science courses.

Results

The results of the follow-up Cooperative Biology Test, adjusted for performance on the post-test given at the end of the 1957-58 experiment, are shown in Table 1.

All of the assumptions underlying the use of covariance analysis, such as homogeneous variance and parallel regression, were tested and found to be tenable for all three comparisons. The statistical tests for

TABLE 1 — ADJUSTED FOLLOW-UP SCORES ON THE COOPERATIVE BIOLOGY TEST FOR TELEVISION AND NON-TELEVISION GROUPS ACCORDING TO NUMBER OF COURSES TAKEN, CINCINNATI PUBLIC SCHOOLS, 1959-60

Number of Science courses taken since Biology	*N*	*Television Group Averages*	*N*	*Non-Television Group Averages*	*Differences TV - Non-TV*
0	40	54.99	27	54.60	+.39
1	66	61.22	64	61.52	−.30
2	31	63.86	23	64.31	−.45

determining the significance of difference shown in the last column of Table 1 revealed that these differences might easily be attributable to chance variation. It should be pointed out that the averages shown in Table 1 were adjusted separately for each classification in the first column.

It was stated earlier that the only significant difference between the television and non-television classes in the 1957-58 experiment was found between classes of above average ability where it was shown that the television classes achieved significantly better than the non-tele-

vision classes. In order to determine whether these above average classes continued to maintain a higher level of achievement than the non-television classes, the four classes (two television and two non-television) at the above average ability level were singled out and analyzed separately using covariance techniques. These four classes were all taught by the same teacher and remained in the same school at the time the follow-up test was given. The average IQ was 128. The various averages made by the television and non-television classes are shown in Table 2.

TABLE 2—AVERAGE COOPERATIVE BIOLOGY TEST SCORES MADE BY THE ABOVE AVERAGE CLASSES, CINCINNATI PUBLIC SCHOOLS, 1959-60

Test Function	*Test Form*	*Date*	*TV Classes (N=60)*	*Non-TV Classes (N=43)*	*Difference Between Adjusted Averages (TV - Non-TV)*
Pretest	X	9-57	51.10	48.09	
Post-Test	Y	5-58	67.08	61.63	
Follow-Up Test	X	3-60	66.65	63.16	
Post-test Adjusted for Pretest			65.95	63.19	2.76 (significant)
Follow-Up Test Adjusted for Pretest			65.74	64.42	1.32 (non-significant)
Follow-Up Test Adjusted for Post-test			64.90	65.61	—.71 (non-significant)

The difference of 2.76 for post-test averages adjusted on the basis of pretest averages was found to be significant beyond the 5 percent point. This difference reflects the superiority of the television method for the above average pupils reported in the original study. The follow-up test averages adjusted on pretest averages show a difference of 1.32 in favor of the television group, although this difference may be attributable to chance variation.

The comparison which most accurately reflects retention, i.e., amount remembered *after* learning has taken place, is that between the follow-up test average adjusted on the basis of post-test performance. This difference of —.71 also lacks significance of difference between television and non-television groups.

It appears that although the television method was found to be significantly superior to the conventional method immediately after the experimental period, this superiority is canceled after follow-up testing approximately two years later. This trend may be seen best by com-

paring directly the unadjusted post-test and follow-up test scores. For the television classes the averages were 67.08 and 66.65 for the post-test and follow-up test, respectively. This represents a loss of approximately .43 points. Similar averages for the non-television classes are 61.63 and 63.16 for the post-test and follow-up test, respectively. The latter difference represents a gain of 1.53 points.

The lack of significant difference between the adjusted follow-up test methods averages, therefore, is not a matter of a significant decrease in test score for the television classes but rather a significant increase for the non-television classes.

Discussion

This study has shown that televised instruction in biology does not result in significantly higher or lower retention than does conventional instruction. Both methods resulted in almost perfect retention, at least in terms of criterion test scores. This was true for groups who took none, one, and two science courses in addition to biology. The high retention, however, is due at least in part to the fact that both the pre-test and the follow-up test were identical forms.

It is difficult to explain why the analysis of the above average ability classes showed a significant gain for the non-television classes while only a very slight loss for the television classes. One could suspect that the reason might lie in the number of science courses taken by these two groups. The fact that the television classes took approximately the same number of science courses* (an average of one per pupil) as the non-television classes seems to rule out this possibility. Investigation of the type of science courses taken revealed that an approximately equal proportion of pupils in the television and non-television classes took courses such as physiology, zoology, botany, chemistry, and physics.

Since the above average non-television classes achieved an increase in criterion scores from post-test to follow-up test, perhaps the concept under consideration should be transfer of training rather than retention. By definition, increments in learning cannot be explained by retention, since retention refers only to what has been learned. If this is true, one might question why televised instruction resulted in less transfer of training for above average pupils than did conventional instruction.

One hypothesis is that classroom interaction and comprehensive

* A t-test revealed no significant difference in number of other science courses taken.

discussion, present to a greater extent in the conventional than in the television classroom, might be more conducive to transfer. This hypothesis seems particularly tenable in view of the fact that experimental classes had no time for immediate follow-up and discussion, since the telecast occupied the full class period. This situation was rectified the following year and resulted in a uniform showing of superiority for the television method when comparisons were made immediately after the experimental period (3).

Conclusions

1. Televised instruction in biology did not result in a greater or lesser degree of retention than did conventional instruction after approximately two years.

2. There is some evidence to show that above average pupils who were taught biology in the conventional manner have a greater potential for transfer of learning than pupils taught by television. This may be a function of the lack of time available to television classes for immediate follow-up and discussion.

REFERENCES

1. Boone, W. F. *Evaluation of the U. S. Naval Academy Educational Television as a Teaching Aid.* Annapolis: U. S. Naval Academy, 7010 7-26-54; October 29, 1954.

2. Jacobs, James N., and Bollenbacher, Joan K. "An Experimental Study in Teaching High School Biology by Television in the Cincinnati Public Schools. *Science Education* 43: 399-405; December 1959.

3. Jacobs, James N., and Bollenbacher, Joan K. "Teaching Ninth-Grade Biology by Television." *AV Communication Review* 8: 176-93; July-August 1960.

4. Parsons, T. S. *A Comparative Analysis of Some Outcomes of Instruction by Kinescope, Correspondence Study, and Classroom Procedures.* Ann Arbor: School of Education, University of Michigan, 1955. (Paper also read at the American Psychological Association Convention, San Francisco, September 1955).

5. Paul, J., and Ogilvie, J. C. "Mass Media and Retention." *Explorations* 4: 120-23; 1955.

6. Ulrich, John H. *An Experimental Study of the Acquisition of Information from Three Types of Recorded Television Presentations.* Doctor's thesis. Iowa City: State University of Iowa, 1955. Abstract: Dissertation Abstracts 15: 2346, 1955.

Student Attitudes Toward Instructional Television: Additional Evidence

*A report in brief by Howard M. Bobren**

THIS ARTICLE is a follow-up of an earlier report in this journal by the author and Mr. Sheldon Siegel on student attitudes toward instruction by closed-circuit television.[1] The first study reported the attitudes of two groups of college students toward an engineering course taught to one group by television, to the other in the traditional manner. The students taught by television rated the course and their instructors relatively lower than those who received conventional instruction.

The same course is now offered only by television. This paper reports on present attitudes toward the course.

It was suggested in the previous report that the relatively negative attitudes of the television students could be attributed to (1) the fact that they were being exposed to a new experimental technique of teaching which did not include all sections of the course; and (2) that the television techniques themselves were relatively unpolished. Since the course is now offered exclusively through television and since techniques have become increasingly sophisticated after two years of production experience, it seemed expedient to study the present attitudes of students and compare them with those expressed two years ago by both television and non-television sections.

METHOD

An engineering course offered at the University of Illinois designed to familiarize students with the resistance of materials was utilized for the study. In the previous report it was noted that the course traditionally met once a week for a two-hour period which was usually consumed by a lecture-demonstration, short discussion, and quiz. Approximately 12 students, meeting in a laboratory with an instructor, were accommodated in each section. The laboratory equipment, used for demonstration purposes only, was not handled by the students.

*The author is assistant to the director, Institute of Communications Research, University of Illinois.

[1] Bobren, Howard M., and Siegel, Sheldon L. "Student Attitudes Toward Closed-Circuit Instructional Television." *AV Communication Review* 8: 124-28; May-June 1960.

General Plan of the Experiment

In the fall semester of 1958 ten sections of the course were selected for the experiment, five of which were taught in the conventional manner and five via television. The conventional sections were taught as in the past. The television sections also met once a week for a two-hour period where the lecture-demonstration was given to all sections at the same time, and at some time during the two-hour period, the group would break up into small sections for discussion periods.

In the spring semester of 1960 the course was offered only via television. There were five sections of approximately 20 students each, all meeting at the same two-hour period. The period was taken up entirely by a lecture-demonstration on closed-circuit television, with no break for discussion.

Subjects

All subjects were male—52 in the original experimental group, 60 in the original control group, and 85 in the 1960 experimental group. All foreign and some transfer students were eliminated from the study.

Test Material

At the last class meeting of the semester, all students were administered a questionnaire designed to measure the attitudes of the students toward the course. The questionnaire used in the 1960 study was identical to that used in 1958.

Administration of Test Materials

Because we wanted the frank opinions of the students, we were concerned that their answers not be motivated by the fact that they had not yet received their final grades. Therefore, we assured them that their responses would in no way affect their grades. To put them even more at ease, one student in each section, selected at random, collected all copies of the questionnaire and held them until the final grades had been posted.

ANALYSIS AND RESULT

Means and standard deviations were computed on each item in the questionnaire for both experimental groups and the control group, and the three groups were compared on each item.

In the previous report, the most striking difference occurred when the students were asked to rate the concept "This course." The 1958 television group differed significantly from the conventional group on 10 out of the 11 scales. The television group rated the course less pleasant, less clear, less fair, less good, less successful, less meaningful, less wise, less understandable, less interesting, and less simple, than did the conventional group. The only scale that did not differentiate between the two groups was *worthless-valuable*.

When the 1958 television group is compared with the 1960 group on their ratings of "This course," the groups differ on only two out of the 11 scales. The 1960 group considers the course more clear and more simple than did the 1958 group.

When the 1960 television group is compared with the 1958 non-television group on ratings of "This course," the groups differ significantly on nine out of the 11 scales. The 1960 television group considered the course less valuable, less pleasant, less fair, less good, less successful, less meaningful, less wise, less

understandable, and less interesting, than did the 1958 conventional group. The two scales that did not differentiate the groups were *clear-hazy* and *simple-complicated*.

DISCUSSION

The results of the present study confirm the findings of the previous one. Students taught via television have relatively negative attitudes toward the course as compared to students taught in the conventional manner. There was no over-all change in the general evaluation of the television course from 1958 to 1960. The only change in attitudes is that the course now appears to be more clear and more simple. This may be due to improved television techniques and viewing equipment.

The implications of such findings may be of concern to those who consider the relationship between attitudes and learning. Although televised teaching is becoming more and more important, its use gives rise to relatively negative attitudes toward particular courses which may result in poorer learning.

TV Program Selection as a Function of Prestige

A report in brief by Kenneth William Hirsch

ONE PROBLEM confronting television programmers, both at the station and network levels, has been a discrepancy between what a vocal minority *says* they would like to view and what surveys indicate *is* viewed by the general public. A question is raised: Would these articulate few who call for better, more "cultured" programming view such programs, or would they, too, seek entertainment in their TV viewing? The assumption is made that a prestige factor exists which accounts for the difference. Pinpointing this factor would have significance for audience-measurement techniques which use interviews, as well as for programmers.

An attempt to throw some light upon one aspect of this question was made by carrying out a study employing an "after-only" design on early teen-agers on March 7, 1960. A questionnaire was administered to four nongraded classes of first year English students from Woodside High School, California. Two classes were given a control form and two classes an experimental form on this questionnaire, with no reference made to the difference in forms. The control group of 52 students was asked the following:

> You have invited a very close friend to spend an evening at your home. You can aim your outside TV antenna to pick up either the station from the north, or the station from the west. With which station would you entertain your friend?

The students were asked to check which series of programs they would choose. The programs were chosen from those carried on the major San Francisco stations the previous week. They were deliberately chosen to make a subtle difference, rather than a "black-white" choice, which might easily have projected a "preference" bias. Care was taken that the "cultural" programs were all good shows, so that there would be little discrepancy in program *caliber* when compared with the "entertainment" programs, thereby concentrating choice difference on program *type*. (See Fig. I.)

The same questionnaire was given to the experimental group of 50 students, except for a difference in the question, which now read:

> You have a foreign exchange student in your high school, and you have invited him to spend an evening in your home. He has never watched television before, and would like to do so. You can aim your outside TV antenna to pick up either the station from

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	North Station Programs	*West Station Programs*
6:30- 7:00	TWENTIETH CENTURY (documentary) "The Depression Years"	LAWMAN (western)
7:00- 8:00	PERRY COMO (variety)	PERRY COMO (variety)
8:00- 8:30	GUNSMOKE (western)	GUNSMOKE (western)
8:30- 9:00	PHIL SILVERS (comedy)	PHIL SILVERS (comedy)
9:00-10:00	STARTIME (drama) Shakespeare's "Hamlet"	RAWHIDE (western)
10:00-10:30	THE UNTOUCHABLES (crime)	THE UNTOUCHABLES (crime)
10:30-11:00	CONQUEST (science) "The Problem of Mental Illness"	G. E. THEATRE (drama) "The Book of Silence"
11:00-11:30	RED SKELTON (comedy)	RED SKELTON (comedy)

FIGURE I.

the north, or the station from the west. With which station would you entertain your foreign guest?

The control group's choice involves considering another person for the purpose of making the test conditions identical, but to all intents and purposes, this person is closely identified with the respondent by being a "close friend." The experimental group, on the other hand, is placed in the position of entertaining a "foreign exchange student." Such a person connotes a high degree of education and prestige to the American high school students. They are, therefore, placed in the position of choosing what they would like a high prestige person to think they view, rather than what they really would view under more comfortable circumstances. (See Fig. II).

This difference is significant at the .0007 level, using a one-tailed test. (The difference was in the direction anticipated.) No sex difference occurred. Girls seemed no more likely to choose "cultural" programs than boys, and were equally likely to want to impress a foreign student.

From the results, we conclude that the prestige element influences the students' statements of what they prefer to watch on television.

"Close Friend"	38 students (73 percent)	chose west (entertainment)
(control) group:	14 students (27 percent)	chose north (cultural)
"Foreign Friend"	21 students (42 percent)	chose west (entertainment)
(experimental) group:	29 students (58 percent)	chose north (cultural)

FIGURE II.

Measuring Attitudes Toward Filmed Courses

A report in brief by Joseph M. Sadnavitch and W. James Popham

Dr. Sadnavitch, associate professor of education at Northern Illinois University, is presently consultant in special education conducting a survey of special education needs in 22 counties of Illinois served by the university. Assistant professor of education at San Francisco State College, Dr. Popham is currently completing the second of two experiments under Title VII dealing with the effectiveness of tape recorded lectures in college teaching.

THE PRODUCTION of an increasing number of film series for secondary schools has created a need for measuring instruments which can be employed to assess behavioral outcomes associated with the use of these films. The teacher, as well as the researcher, will find numerous occasions to utilize tests and scales in connection with filmed courses, but will encounter few appropriate measuring instruments.

As one facet of an investigation supported by a Title VII research grant, an attitude scale was developed to assess students' attitudes toward film courses *per se* [1] (as opposed to attitudes toward a particular filmed course such as the Harvey White physics series). The present paper will describe the development and application of the scale.

The *Attitude Toward Filmed Courses Scale* was developed from an original pool of 100 items consisting of statements concerning filmed courses. These statements (some favorable and some unfavorable) were constructed on the basis of literature in the fields of attitude assessment and audiovisual instruction. The 100 items were reviewed by 16 judges (faculty members and advanced graduate students) who ranked each statement on an 11-point favorability-unfavorability continuum. These rankings served to identify the most positive and negative, as well as the least ambiguous statements. From the original

[1] Conducted by Kansas State College, Pittsburg, July 1, 1959 to June 30, 1960. For a description see: Popham, W. J., and Sadnavitch, J. M. *The Effectiveness of Filmed Science Courses in Public Secondary Schools.* Kansas State College of Pittsburg, August 1960.

pool of items, 30 were selected for inclusion in the scale.

The scale was administered to a group of southeast Kansas secondary-school students who were participating as subjects in an experiment dealing with the effectiveness of the filmed physics and chemistry courses distributed by Encyclopaedia Britannica Films, Inc. The scale was administered at the end of an academic year in which the students had received their science instruction primarily via film. In all, 131 physics students and 206 chemistry students com-

TABLE 1—DISCRIMINATING EFFICIENCY OF ITEMS IN THE "ATTITUDE TOWARD FILMED COURSES SCALE"

Item	*Chi Square*
Taking a course on film makes the student feel keenly interested in the subject	114.58
No sane person would take a course on film	100.96
A course on film does not motivate students to do better work	73.58
Taking a course on film is too boring	91.08
The content presented on film moves so rapidly that the student can't keep up	87.30
Taking a course on film should be required of all students	69.24
A suitable class atmosphere is impossible when a filmed course is taken	62.76
Filmed courses aid in developing a sound relationship between the student and classroom teacher	64.16
A student taking a filmed course can never really feel like he knows the teacher in the film	47.98
Taking a course on film is all bunk	106.14
Filmed courses will give students the ability to interpret situations they will meet in real life	69.58
Courses on film make it easier for the student to see and know what is happening	73.02
Filmed courses are so difficult that they should be used only on the college level	83.10
Courses on film eliminate the possibility of taking notes	13.06*
The best class atmosphere is developed while taking a course on film	67.24
A course on film interferes with learning	77.92
Taking a course on film is the best school experience anyone could have	86.72
The average student gets nothing worth having from a filmed course	71.69
Filmed courses are easy enough to be used at the elementary school level	44.84
Courses on film provide plenty of opportunity for taking notes	31.02
Filmed courses are the best method used in school	117.34
Filmed courses move at a pace which allows the student to keep up easily	84.30
Filmed courses are the best way to hold a student's interest	99.28
Filmed courses are the worst method used in school	94.86
Courses on film do not provide enough time for class discussion	61.06
Using films rather than lectures is the most effective way to cover the course content	75.54
Taking a course on film provides better content coverage than the usual classes	61.58
Filmed courses provide sufficient time for class discussion	80.00
The content on films tends to contradict text materials	27.68
A course on film causes certain areas to be slighted in coverage	22.62

* Significant beyond the .05 level; the rest are significant beyond the .01 level.

TABLE 2—MEANS AND STANDARD DEVIATIONS OF PHYSICS AND CHEMISTRY STUDENTS ON THE "ATTITUDE TOWARD FILMED COURSES SCALE"

Group	*N*	*Mean*	*Standard Deviation*
Physics	131	58.03	19.04
Chemistry	206	49.92	19.98

pleted the *Attitude Toward Filmed Courses Scale*.

Students were instructed to indicate strong agreement, agreement, uncertainty, disagreement, or strong disagreement with each of the 30 statements in the scale. Items were scored by assigning a value of four points to the response most favorable toward filmed courses, three points to the next most favorable response, and so on to a zero for the response least favorable. Hence, a high score on the scale indicates a favorable attitude toward filmed courses, while a low score indicates an unfavorable attitude.

In order to determine the degree of internal consistency of the items, responses of both physics and chemistry students were pooled. Responses of the upper and lower 27 per cent of the group (in terms of total score) were selected. The discriminating efficiency of each item was assessed through contrasting the responses of the two groups by chi square analysis. Twenty-nine of the items discriminated beyond the .01 level of confidence and the 30th item discriminated beyond the .05 level. All items were, therefore, considered satisfactory discriminators and were retained in the scale.

The 30 items and the chi square values yielded by contrasting the responses of students with extremely favorable and unfavorable attitudes are presented in Table 1.

Having determined the suitability of the items in the scale, responses of chemistry and physics students were treated separately. Means and standard deviations for the two groups were calculated and are presented in Table 2.

Teachers and researchers working with filmed courses may encounter situations requiring a scale such as that described herein. It will be a relatively simple matter to prepare a version from the list of statements presented in Table 1. If desired, copies of the original instrument may be obtained from the authors.

Although the student sample employed in the development of the instrument was not large, it is believed that the *Attitude Toward Filmed Courses Scale* is potentially valuable to educators dealing with the recently developed filmed courses.

COMMUNICATIONS PROGRAMS IN HIGHER EDUCATION: OBJECTIVES AND CURRICULA

Donald P. Ely

This is the second in a series of articles on communications programs in higher education by the author who is director of the audiovisual center at Syracuse University. The first article, "Communications Programs in Higher Education," appeared in AV COMMUNICATION REVIEW, *Winter 1960.*

THE DISCUSSION which follows is part of a comprehensive study of the emerging discipline of communications as it is observed through its present structure in 21 institutions of higher education. Programs treated here give evidence of a coherent arrangement of course and/or administrative patterns which shed light on communications as an interdisciplinary approach.

There are three primary factors involved in the analysis of higher education programs: (1) objectives, (2) curricular structure, and (3) administrative organization. While these three are diverse and must be considered as such in an analysis of existing communications programs, they are interrelated and cannot be considered separately in actual operation.

This paper is an analysis of the present objectives and the undergraduate and graduate curricula of communications programs as they existed in 1959-60. (The administrative structure of the programs was covered in the previous article noted elsewhere on this page.) In preparing the present analysis, the author kept in mind a statement from *The Evaluation of Higher Institutions,* a guide for accrediting institutions of higher education in the North Central Association. *The Evaluation* is specific about providing evidence that objectives, as established in the curriculum, are administered effectively, to wit: "The institution should be able to show clearly that the curriculum as described in published statements is effectively administered in the case of individual students . . ." *

OBJECTIVES

As the objectives of the various communications programs are analyzed, it is evident that they have been developed in terms of the student of communica-

* Zook, George F., and Haggerty, M. E. *The Evaluation of Higher Institutions,* Vol. 8, No. 1. Chicago: University of Chicago Press, 1936. p. 152.

tions, that is, in terms of the results sought for each student who experiences the communications program. The implementation of objectives then is discovered within the prevalent curriculum. In a broad sense, there are two categories of objectives: one dealing with the acquisition of specific skills and the other with the development of certain attitudes.

Acquisition of Skills

None of the institutions studied lists acquisition of vocational skills as an objective of the program. Boston University mentions the "acquisition of professional skills to insure an adequate degree of competence"; Michigan State University wants "to educate students in greater depth in one or more of the specialized areas within the college."

The general education of students is not neglected in the outline of objectives in several institutions. For example, Michigan State University strives "to insure a broad liberal education for all its students" and Stanford attempts "to provide a broad program in the social and literary studies." These objectives, it will be agreed, are common to programs of almost all institutions of higher learning.

While research skills are usually thought of as being synonymous with graduate programs, it is interesting to note that this objective is found in several institutions which have an undergraduate communications program. For example, Boston University, primarily an undergraduate institution in communications, hopes to inculcate "an understanding of the importance of research, its methods and interpretation." At the same time, the University of Wisconsin, which has a graduate program only, states that the program should "provide selected students with experience and training in mass communication theory and research."

Development of Attitudes

A second major category of objectives is concerned with the development of attitudes toward communications (1) as an interdisciplinary field of study and (2) as social institutions.

In view of the fact that the study of communications is an interdisciplinary approach, it might be expected that this factor be delineated in a set of objectives. Several institutions point out the interdisciplinary objectives by such statements as "to cross-fertilize the social sciences and arts of public communication" (University of Chicago); and "to provide programs of study integrated around the concept of man communicating with man" (University of Southern California).

Some institutions specify as an objective the need to relate the study of media to their operation within a social context. New York University, for instance, seeks to have students "enlarge their knowledge and understanding, and intensify their concern about mass media as components of our society." The University of Pennsylvania wants "to bring an increasing number of trained minds to bear on the problems created by the mass media and on the situations to which the media contribute."

The objectives of the various communications programs are, for the most part, practical and operational. They are broad enough to allow freedom yet specific enough to be observable. While there is some diversity in stated objectives, they are sufficiently similar in nature to establish a commonality at the

core of each program. This commonality allows for justifiable comparisons of the curricular structure.

Undergraduate Curricula

Programs in communications exist for a variety of reasons and purposes. Functionally, they can be classified in two categories: (1) the major in communications, with emphasis in a traditional field, usually journalism, radio-television or speech; and (2) the interdivisional or interdisciplinary program in communications.

Traditional Fields

Even though a baccalaureate degree in communications is awarded, it is not always a "pure" communications degree. Ten of the 13 institutions offering a bachelor's degree with a major emphasis in communications indicate that the student majors in a traditional field with the emphasis on communications in the minor. Essentially, fields which have always been in existence have assumed a new label for an established program. Justification for use of the label seems to stem from the fact that there are supporting fields related to the broad communications picture in which a student elects a minor concentration. The thought here is to use the communications label to provide focus on the major field or to allow for interdisciplinary experience with which to broaden the approach provided by the major discipline. This approach reflects a reluctance on the part of the undergraduate communications advisors to turn a student loose without some clear departmental identity.

The most popular fields within communications programs are journalism and radio-television. Speech is in a secondary position, with advertising following close behind. Journalism and broadcasting were two of the strong leadership areas in advancing the broad approach to communications when programs first developed. It seems reasonable therefore that the majority of students would concentrate in these fields even though the label of the traditional field has been lost in the communications rubric. Many of the programs have departments, divisions, or specified curricula in traditional fields. For example, the School of Communications at the University of Washington has a Division of Journalism.

Supporting Fields

Almost every curriculum in every college or university has certain specified courses which are required or recommended to support the major area. These requirements are divorced from the general courses required of every undergraduate in the institution no matter what curriculum is being pursued. The 13 institutions offering undergraduate degrees in communications were asked to identify departments, other than communications, in which majors are required to take courses which relate to communications. Table 1 shows the frequency or requirements of supporting fields in 13 undergraduate communications programs.

The heavy weighting of required supporting fields toward the social sciences indicates that the media of communications are institutions which exist in a social context. The emphasis on required courses in the social sciences may be evidence of a trend away from the "trade school" approach of earlier journalism and broadcasting toward a more substantive program which pre-

TABLE 1—FIELDS SUPPORTING UNDERGRADUATE COMMUNICATIONS PROGRAM

Frequency of Requirement	
Psychology	7
Sociology	7
Political Science	6
Economics	5
History	4
Linguistics	3
Anthropology	2
Business	2
Public Relations	2
Art	1
Library Science	1
Geography	1

pares students for social responsibility in the media industries.

Core Courses

The developing trend of the undergraduate programs in communications appears to be toward a relatively small core of courses taught by the faculty in the central administrative unit. Ten of the 13 programs have core courses in communications. Three universities have one course; four require two courses; two require three; and one university has six core courses.

Implicit in the definition of communications programs is the need for some integrative interdisciplinary experience. Since many of these programs grew out of course offerings already available in traditional departments (collected and listed in such a manner as to form a communications major by addition), the acknowledgement of the necessity for core courses is not without its point. Without such courses the student is expected to assimilate and organize the diverse approaches offered by a miscellany of courses into a meaningful pattern on his own initiative. A basic course generally comes near the beginning of the communications program as a prerequisite to the major. This is the survey course which introduces the students to the range and scope of the communications field. Examples are "Communication Fundamentals" at Temple University and "Communication Arts in the Modern World" at New York University. A second course appears during the undergraduate's senior year, such as the "senior seminar" at Michigan State University. This course synthesizes the thinking of the student by pointing up relationships of current and related disciplines. Aside from the core courses, the major program in communications depends primarily upon selected offerings from traditional departments.

Curricular Trends

An over-all analysis of undergraduate communications curricula would seem to indicate a developing pattern after several years of experimentation in each university. The pattern has been developed around one, two, or three core courses with students majoring in a traditional field, generally journalism or radio-television, supported by courses in related fields, especially the social sciences. Very few programs begin this way, but most of them appear to be headed in the direction of this pattern if they have not already arrived there. There is a movement away from the "trade school" courses and toward courses which deal with mass media as social institutions.

GRADUATE CURRICULA

Traditional Fields

While there are distinctions between the master's and doctoral programs, there are certain commonalities in the

17 institutions conferring graduate degrees in communications. The early leadership of journalism in establishing graduate study in communications is evident when an analysis is made of undergraduate fields producing graduate students. The majority have a journalism background with the next highest number coming from the social sciences. Other contributing fields are broadcasting and the humanities. Speech is clearly dominant in several institutions and almost non-existent in others.

The graduate program in many institutions is a repetition of the undergraduate pattern where a student concentrates his course work in one traditional field and distributes the remainder across related areas. The social sciences clearly dominate the picture with sociology and political science mentioned more frequently as dominant traditional fields. Even though graduate students come primarily from undergraduate backgrounds in journalism and to a lesser degree in broadcasting and the social sciences, the greatest proportion of major course work is accomplished in the scope of the social sciences. There is a marked decrease in studying the media of communication *per se* and a substantial increase in studying the social institutions affected by the communications media.

Supporting Fields

Within each communications program the student must meet requirements for courses which relate to his major interest even though these fields are not an integral part of the communications organization. The strength of the social sciences once again provides the bulk of the courses which students are "strongly encouraged to take." Table 2 reveals the situation in the 17 institutions offering graduate degrees in communications.

TABLE 2 — DEPARTMENTS OTHER THAN COMMUNICATIONS IN WHICH GRADUATE STUDENTS ARE "STRONGLY URGED" TO TAKE COURSES

Sociology	14
Psychology	13
Political Science	9
Economics	6
Linguistics	5
Advertising	4
Public Relations	3
English	3
Philosophy	1
Art	1
American Civilization	1
History	1
Geography	1

Core Courses

Most graduate programs reflect the philosophy that there must be core courses required of all graduate students. At the beginning of the student's program a course which presents the broad perspective of the communications field—an overview or a survey—is usually found. Likewise, there is evidence to indicate that a research course is an integral part of the required core courses in communications.

The introductory communications courses are listed in college catalogs in various ways: At the University of Southern California we find "Survey of Mass Communication"; at Boston University, "Communication and Society"; and at the University of North Carolina, "Social Aspects of Mass Communication." There are courses of this type in most of the graduate programs.

The research course is usually concerned with research methods as they apply to mass media studies. Course titles illustrative of this fact are: "Re-

search Methods in Mass Communications" at the State University of Iowa, "Scope and Methods of Communication Research" at the University of Minnesota, and "Seminar in Research Design and Methodology" at the University of Wisconsin. Courses of this type are found in most graduate programs.

CONCLUSION

This report has shown that there are areas of commonality and areas of diversity in existing communications programs in higher education. The undergraduate and graduate curricular structure reflects, for the most part, the stated objectives of the program. Several questions remain to be answered: "What is being accomplished under the communications label that could not otherwise be accomplished?" "What are some of the emerging trends in this rapidly growing field?" These topics will be covered in subsequent articles.

AUDIOVISUAL AIDS AND LANGUAGE TEACHING IN THE USSR

E. W. Bauer

This article by Mr. Bauer is part of an independent study of audiovisual techniques as employed in European countries and the USSR, particularly in language teaching. He wishes to make clear that it does not represent a complete analysis. Reports and studies of the work in this field in the USSR have been inconclusive and contradictory. The author believes a reliable and satisfactory analysis can only be attained after intensive study based on both personal experience and a thorough knowledge of the Russian research literature. His study has so far been limited to the most recent developments as reflected in the literature. Mr. Bauer was visiting professor of German at DePauw University for three years and is currently associated with the German Department at Indiana University where he will conduct a research project under Title VII. As teacher of English and German in Austria, he founded the Austrian Society for Audiovisual Education and still functions as co-editor of its official journal.

LANGUAGE TEACHING has always played an important role in the Soviet educational system. After the views of N. Y. Marr's *Marxist Linguistics* were publicly condemned by Stalin (9), Soviet linguistics returned to the method of comparative historical analysis. The USSR and Germany are probably leading in the field of translated literature by virtue of their highly effective translation centers. Since 1955 language teaching in the USSR has reached a standard which is equal to (and in some centers higher than) that of the central European countries and Scandinavia.

The Pedagogical Institute in Gorjkij has been a leader in research on audiovisual aids in education in general, and its foreign language department has conducted several pilot studies and extensive experimentation programs. Benediktov's study of the effectiveness of films and tape recordings on the mechanics of expression and retention of active vocabulary showed highly significant results (1).

Ever since the Ministry of Education of the Russian Soviet Republic requested the development of new and more active teaching methods from the Foreign Language Institute in Gorjkij in 1954, this institute has developed new methods and distributed new audiovisual materials.

P. I. Cernov (2) and W. A. Shevtchenko (8) report on the use of new filmstrips. B. A. Kolmakov (Pedagogical Institute in Voronesh) reports on techniques with the tape recorder in teaching German to fifth and seventh graders (4). T. G. Kurz reports on the work of the Pedagogical Institute in Leningrad in developing effective teaching methods with silent films, sound films, and filmstrips (5).

A thorough and interesting analysis of the experiments in new methods was made by the Ministry of Education and the schools were encouraged to intensify the use of mechanical aids in teaching.

In 1956 and 1957 all Russian universities introduced a required course in audiovisual methods (especially film techniques) for foreign language students. These are some of the techniques and processes regularly used in Russian high schools and universities:

1. Systematic frequent listening to authentic texts on tape and records recorded by highly qualified native speakers.

2. Regular practice of recording reading texts or assigned themes.

3. Listening to students' recordings and subsequent analysis of same.

4. Transcribing from tape recordings.

5. Semestral or quarterly recordings with subsequent analysis by the teachers.

6. Aural comprehension and pronunciation exercises. Critical comparison of master recording and student's recording on dual track tape recorders.

7. Simple synchronous oral translation with and without written response.

8. Numerical analysis of the speed of pronunciation (accent, intonation) and size of units (phonics, phonemics), analysis of number and type of pronunciation mistakes.

9. Utilization of Russian motion pictures and filmstrips which were incorporated into exercises for conversation and speaking in a foreign language.

10. Utilization of foreign motion pictures incorporated in the syllabi.

11. Synchronous recording by students on magnetic tape while they watch silent films and filmstrips with subsequent analysis and evaluation of the recording by teacher and student.

12. Regular teacher conferences on audiovisual methods and evaluation reports, etc.

Russian Language Laboratories

In 1953 the first language laboratories were established in the model schools and institutes of Gorjkij, Leningrad, Moscow, and Voronesh. Record players were used for a considerable time but proved to be inferior to the tape recorder in sound quality and effective programming. B. A. Kolmakov of the Voronesh State Pedagogical Institute reports on the use of the portable Russian tape recorder "Jausa" which is a combination record player and tape recorder (4). He explains some of the techniques which correspond to those used in American language laboratories. He stresses thorough training in phonology and special exercises in rhythmic breathing. The Russian linguists and language teachers believe in pattern drill exercises based on the structural-lin-

guistic method. The language laboratory has improved tremendously the standard of comprehension, pronunciation, speaking and reading ability, and structural knowledge of foreign languages, but the Russian teacher still faces an enormous lack of the "foreign language milieu" in many parts of the country.

One great aid in this dilemma to Russian specialists seems to be an increased production and utilization of films and filmstrips showing the atmosphere of the foreign speech community. The Leningrad Pedagogical Institute has been a leader in the production of visual materials for language teaching. A number of special filmstrips were produced, e.g., one entitled "Morning" which not only teaches vocabulary and shows the milieu of an English school girl but is also an excellent aid to teaching the present continuous form and the tenses of modal auxiliaries.

The motion picture is used in sound and silent versions and several institutions use installations which are not only available for class but also for individual study. The tendency towards increased use of mechanical media in individual study (home study) is very strong in Soviet education.

The language laboratory as a teaching machine is well developed. Tape recorders are connected with a "radio-commutator" and a "telephone-commutator," a multi-position switchboard with amplifiers and transformers. All of the machinery is located in the control room where the laboratory technician connects the students' booths with the desired programs which are taken either directly from European radio stations or from prerecorded tapes or records. When recording, the students are equipped with activated earphones. They can listen to the master voice and their own voices simultaneously or subsequently, according to the type of exercise they are practicing. The active earphone listening system in Russia is called "partial compensation of the hearing sense." It is interesting to see that Russian language laboratory specialists, contrary to Marty (6), believe in the student's monitoring himself or in the so-called "listen-respond" technique. It has to be added that, according to the literature, the laboratories are equipped with full soundproof cabins rather than semi-soundproof booths which, because there is no additional disturbing noise in the room, answers some of Marty's objections to the "isolation-value" of self-monitoring.

The control room in the Russian language laboratory is equipped with intercom panels and the teachers monitor the students at the console.

The laboratory is also used for exercises in simultaneous translation and for students' synchronous recordings to silent films, filmstrips, or slides.

Recent and Future Developments

In order to increase and concentrate all efforts in the audiovisual field, the following measures have been introduced recently:

1. Establishment of a language laboratory association for better coordination of the individual institutes.

2. Action by the "scientific methods centers" of the Soviet Union to establish chairs for motion picture techniques and departments for the training of language teachers who are audiovisual specialists. The need for specialists who are qualified foreign language teachers, experts in teaching methods and general pedagogics, as well as in the technical

aids, has become so great that it cannot be sufficiently met anymore. This need is increasing from year to year. Model textual materials (for programmed teaching) are being created and distributed through the "scientific methods centers" to the "micro-districts" or local branch offices in school districts. Teaching films, filmstrips, and slides are being produced and large scale research projects conducted with these teaching media.

3. Education and information of the masses for the purpose of familiarizing them with the teaching techniques used with audiovisual aids (teaching laboratory installations), motion pictures, and television. This is being accomplished through the foundation of voluntary associations.

4. Establishment of a central audiovisual research institute for the development of effective methods in the use of technical media. This institute has the task of planning, coordinating, and carrying through research in methods and techniques connected with the use of technical media, with the production of audiovisual materials, and with activities in related fields. A master "problem-laboratory" will be established in this research institute.

It is apparent from these notes that the standard of Russian language teaching which has always been considerably high has, through the audiovisual approach, received new and highly effective impulses. The important and relevant factors in this development seem to be:

1. Excellent organization and coordination of all efforts in research and teaching practice.

2. High standard of working quality with teacher and student.

3. Popularization of the subject matter of foreign language and culture itself in order to create readiness, understanding, and interest in the "foreign language milieu" among the broad masses—the only way of really making a nation "foreign language conscious."

In this connection it is appropriate also to refer to the high degree of foreign language teaching in the USSR at pre-school age. T. A. Cistjakova (Leningrad) reports research on retention indices of children in different age groups. She uses different audiovisual aids like posters, pictures, the electroboard, lottery games, and various other motivating games (3). Without attempting to give a detailed report on the results of her study, it should be of purpose here to mention that in three months of teaching (48 lessons at 30 minutes per lesson) the five year olds learned and retained 150 foreign words which they did not forget after an 18-day interruption, while the eight to ten year olds could retain only 250 words in 58 lessons at 45 minutes per lesson (i.e., 43.5 hours). With the application of audiovisual media, it was possible to create a "Sprachmilieu" at a very early age. It need not be stressed, of course, that the kindergarten teacher should know the foreign language, know how to teach it to the little ones, and what audiovisual aids to use and how to use them. (I would also like to refer to the feltboard materials used in Austrian schools, which have proved to be of outstanding value in teaching foreign languages to pre-school and elementary children.)

There is one other aspect which we have to bear in mind when we look at Russian education, especially the tendency towards programmed learning materials and mechanical media in teach-

ing. There is a very strong emphasis laid on the traditional European humanistic values of literary education. Mehnert (7), in his very interesting study, comes to the conclusion that the Soviet man has remained humane. He may be modified through Communism and technization but he does not become a robot without soul. The Russian has come to terms with Communism because he thinks the historical-philosophical interpretation of Marxism-Leninism is right. However, he strives for an optimal measure of freedom and security in his personal sphere, especially in the family. The dynamics of the fast development of the sciences, education, and technical processes, which is forced by the state, brings forth the intellectualization and stimulation to independent thinking. The intensive instruction in the classical Russian literature common in Russian schools has been explained as possibly being a "surrogate" for the missing religiously founded ethics.

The greatest aid however in the upgrading process of Russian education, with or without audiovisual media, may not be seen in these media themselves but in the superior training of teachers who use them and the fertile receptacle of the diligent student population and the nation as a whole, which has a hunger for knowledge as it never has had before in Russian history.

The utilization of any mechanical aid in the USSR, therefore, seems to be based on a healthy predisposition of the learner and a well planned organization. Emphasis is laid on the facilitation of independent individual study through audiovisual aids.

References

1. Benediktov, B. A. "The Use of Films in the Development of Speech Techniques in Learning Languages." *Inostrannye jazyki v shkole* (Foreign Languages in the Schools), January-February 1956. See also: AVISO [*Zeitschrift der Osterreichischen Gesellschaft fur Audio-Visuelle Erziehung* (Journal of the Austrian Society for Audiovisual Education)], June 1958.
2. Cernov, P. I. "The Use of the Filmstrip in the Teaching of Foreign Languages." *Inostrannye jazyki v shkole* (Foreign Languages in the Schools), January-February, 1955.
3. Cistjakova, T. A. "The Learning and Retention of Foreign Language in Different Age Groups." *Inostrannye jazyki v shkole* (Foreign Languages in the Schools), January-February 1959.
4. Kolmakov, B. A. "The Use of the Tape Recorder in School and Home Instruction." *Inostrannye jazyki v shkole* (Foreign Languages in the Schools), May-June 1959.
5. Kurz, T. G. "The Utilization of Motion Pictures and Filmstrips in Language Teaching." *Inostrannye jazyki v shkole* (Foreign Languages in the Schools), May-June 1959.
6. Marty, Fernand. *Language Laboratory Learning*. Wellesley, Massachusetts: Audiovisual Publications, 1960.
7. Mehnert, Klaus. *Der Sowjetmensch* (The Sovietman). Stuttgart: Deutsche Verlagsanstalt, 1960.
8. Shevtchenko, W. A. "The Use of Motion Pictures and Filmstrips in the Teaching of English." *Inostrannye jazyki v shkole* (Foreign Languages in the Schools), March-April 1959.
9. Stalin, J. V. "On Marxism in Linguistics." *Pravda*, June 20, 1950.

SIMULACRICS: AN ANACHRONISM?

James Q. Knowlton

IN THE WINTER 1959 ISSUE of this journal, C. Denis Pegge discusses the concept of "simulacrics." In this paper he states on pages 33-34 that "Language stands distinct from thought . . ." and that "It is *almost incidental* that, as well as being a means of describing consciousness and thought, it [language] has become a valuable aid to thought" (emphasis is mine).

Pegge is here challenging a great many findings of students of the psychology of language; and in particular, the Sapir-Whorf hypothesis which argues that people belonging to markedly different language families experience and think about their worlds in markedly different ways (4, 11, 17). It is Whorf's view that no individual can possibly describe his world impartially, because "users of markedly different grammars are pointed by their grammars toward different types of observations and different evaluations of externally similar acts of observation, and hence are not equivalent as observers but must arrive at somewhat different views of the world" (17:11).

Language, perception, and thought have pervasive and significant interdependencies. Contrary to the usual view, language is not simply the "vehicle of thought"; rather, one's language determines how one categorizes and generalizes about the world.

While scholars differ in their acceptance, and even in their precise interpretation of the Sapir-Whorf hypothesis, this view has nevertheless had a profound effect on the thinking of psychologists, linguists, and anthropologists—even stimulating the development of the new field known as *psycholinguistics*. One would therefore expect Pegge to take account of the evidence tending to confirm the Sapir-Whorf hypothesis and then to present his own, presumably opposing, evidence. He did neither. He offered no evidence for his own position, nor did his bibliography contain even a single reference to the writings of any active researcher or critic in this field.

There are other objections. To begin with, I had difficulty understanding

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Pegge's need for a new term ("simulacrics") when there is already a plethora of essentially synonymous terms (e.g. signs designated "iconic" or "analogical," or phrases such as "non-verbal communication" or 'isomorphic sign-referent relationships"). Pegge's "future" field of simulacrics, by which he means to signify ". . . a possible future field of study and science of lifelike representation" (9:24), surely is a simulacre of communications orientations that stress art as communication (2, 7), that deal generally with the iconic sign (8), the analogical sign (10), or that speak of isomorphism between sign and referent category (1).

Pegge makes no reference to relevant contributions by persons who have contributed significantly to this field of "lifelike" communication. Further, he gives no evidence of having any awareness of the contributions of such persons to his "new" field of simulacrics.

Pegge states that simulacrics is to be a science, and yet he disavows the *a priori*. For example he states that "[simulacrics] is not concerned with what through *a priori* reasoning we might think would be the effect of different kinds of film features, nor simply with terms as such, or what a thing should be called . . ." (9:25). Does this mean that Pegge is unaware of the power of hypothesis and deduction for science? If he is serious in his disinterest of what is *a priori*, he is stuck with only a part of science—with the let's-do-this-and-see-what-happens part. His view is attenuated, however, when at one point he plays the role of apologist as in his statement that ". . . predictions and hypotheses, so long as they are not treated as facts before they have been proved, *need not be harmful*, and they set the pattern for experiments" (9:29, emphasis mine). This indisputably necessary pillar in the scientific structure, the hypothesis, need not be harmful! Pegge can hardly be challenged here, but what an understatement.

"Simulacrics [Pegge continues] has a generality of incidence approaching that of communication . . . " (9:24). But simulacrics *is* communication as communication is commonly defined. Wendt (15) has even argued that pictures, especially motion pictures, are not merely communication, but language communication. Most, if not all of Morris' (8) criteria for defining language are met by the motion picture as Wendt shows. How then, can simulacrics (the particular), rival the generality of communication (the generic)? Is Pegge's reader to infer that the significance of simulacrics for human behavior is so great that, by comparison, digital codes such as speech and mathematics are trivial?

Pegge argues that sound in a film detracts from the communicative power of the film because of "lesser perceived realism." He states that the perception of black and white silent motion pictures requires no mediating process, whereas when sound is introduced, mediating processes are required. (He leaves it to the reader to guess what the phrase "mediating processes" is intended to signify.)

The above claims seem not unrelated, and the four "reasons" given in support of the first claim are, in my mind, either untenable or unimportant. The first reason why sound may provide more noise than information is, according to Pegge, because of *"a difference of dimensions* between what is seen and heard" (9:29). Adding sound to sight thereby causes

confusion, for, apparently, the central nervous system cannot efficiently handle the inputs of two senses simultaneously. Pegge's "evidence" is the statement that "There was . . . required for the 'taking in' or comprehension of talking films an intervening process of translating linguistic and other signs, just as that intervening process is needed when reading a book or watching a play" (9:28).

Is Pegge unaware that we all undergo, from birth, a process of *learning to perceive* whereby we come to harmonize the inputs of our several senses? Hilgard (3) discusses this at length, noting that this was understood as early as 1927 by von Hornbostel who wrote a now classic paper entitled "The Unity of the Senses" (5).

The infant has to learn to integrate sensory and motor inputs, to react in terms that are literally mandatory for survival (e.g. in learning to respond in terms of the various perceptual constancies). More recently, sensory-tonic theories of perception (16) have been built upon empirical data showing that no sense functions independently of other sensory inputs. Senden's (12) remarkable report, and Stratton's (13, 14) classical experiments leave Pegge's pontifications with little or no substance. Senden described the responses of congenitally blind persons upon first having sight restored in adulthood. Restoration of sight did not enable such persons to recognize objects visually although they could all "see" and could verbally report their visual sensations. The ashtray on such a person's desk, although immediately recognizable by touch, was yet unrecognizable visually until a great deal of learning to perceive this tactually familiar object (by associating visual and tactual inputs from the ashtray) had taken place. Were mediational processes required here?

Stratton saw the world upside down and with left and right reversed because he wore inverting lenses, and yet he learned to harmonize the inverted visual world with his other senses after a period of bewildering adjustment. Were mediational processes required here?

Some "primitive" peoples, not accustomed to photographic representations, fail at first to recognize clear photographs of themselves or friends. Are mediational processes required here? In short, does the cognition of any class of representations *not* require "mediational processes"? I am uncertain of the answer, but surely Pegge has in no way shown that the "taking in" of the silent motion picture is independent of mediational processes.

Pegge's second argument for the superiority of silent over sound film is claimed to result from "conflict in the mind" over what is seen and heard. "What is seen and what is heard [he claims] often do not seem inherently to belong to one another" (9:29). The possibility of this happening cannot be challenged. But is the question one of possibility or of probability? Cows are seldom made to orate, trees to play trombones, or lovers to speak sweet nothings in loud angry voices; even so, if this were to happen, it would be expected that the viewer would regard such a presentation as "unnatural." Is this Pegge's point?

A third reason for eliminating sound is reported as being due to *"a decrease of visual concentration* because our attention is largely taken up with listening to words" (9:30); while a fourth reason

is that *"the increased length of shot* generally consequent on the use of synchronized speech [is not desirable]" (9:30).

Pegge's four reasons can be seen to be but two in number. The first is that more than one sensory input (first reason) causes conflict (second reason), with a resultant decrease of attention to any one input alone (third reason). The second reason (Pegge's reason four) is that this results in more feet of film when sound is used.

How can an article appearing as recently as 1959 reflect so little knowledge of the current and not so current scene, when this knowledge is directly relevant to the argument the author is making? Why are there so many references from the 1930's and earlier even though these references are frequently used for other than their historical relevance, being often used to support something as "present fact"? References dated in the 1940's and later, minus five that have to do with films *per se,* are nine in number. A third of these are references to the *Encyclopedia Britannica.* While admitting the extremely useful nature of this source, it is a source that is thoroughly revised only once in a decade, and it is therefore a little surprising that three of nine references to the 1940's and 1950's should be to an encyclopedia when a writer is propounding a "new field" and when this writer feels it is necessary to bring facts from the rapidly developing field of psychology heavily to bear. Of the six remaining "recent" references, one is to William James (6), who died in 1910, but whose reference, a reprint, was dated 1950; and the others, while they include writings of several outstanding scholars, do not quote these men in areas relevant to the "future science of simulacrics."

A few minor objections may be noted. Some of Pegge's statements and definitions are tediously tautological. For example: "Because [films] largely make use of lifelike photography . . . films as a class provide lifelike representation" (9:24). Some statements appear to me to be both tautological and false. For example: "It [film] is lifelike because it is thoughtlike" (9:24). Film *may* be "thoughtlike," but not necessarily more so than many non-visualized, even non-iconic representations. More importantly, the implication that when something is "thoughtlike" it is also "lifelike" appears to me to be clearly false in at least one sense, for a great deal can be imagined (thought of?) that is not lifelike. I can think of a 13-headed shorse (sheep-horse) with no body, that flies, composes better than Bach, and eats purple-people-eaters under glass. Finally, in their obviousness, some statements merely clutter the report. For example: "Films as we know them at present utilize primarily these two kinds of perception [visual and aural]" (9:31).

In summary, Pegge's implied new science of the future has a very firm beginning going back quite a number of years. Recently, it has been cultivated by linguists, psychologists, psychiatrists, and others. Pegge gives no evidence of being aware of the contributions of these scholars, for he makes reference to none of them while presenting unsupported statements that oppose their empirical findings as well as their theories. Is Pegge's proposed new field of the future, "simulacrics," an anachronism? If so, in which direction is the error in chronology?

References

1. Arnheim, R. "The Gestalt Theory of Expression." *Psychological Review* 56: 156-71; 1949.
2. Dewey, John. *Art as Experience*. New York: Minton and Balch, 1934. 355 p.
3. Hilgard, E. R. "The Role of Learning in Perception." In *Perception: An Approach to Personality*, edited by Robert R. Black and G. V. Ramsey, p. 95-120. New York: Ronald Press, 1951.
4. Hoijer, Harry, editor. *Language in Culture*. Chicago: University of Chicago Press, 1954. 286 p.
5. Hornbostel, E. M. von. "The Unity of the Senses." *Psyche* 7: 83-89; 1927.
6. James, William. *The Principles of Psychology*. New York: Dover, 1950. 688 p.
7. Langer, Susanne K. *Philosophy in a New Key*. Cambridge: Harvard University Press, 1942. 313 p.
8. Morris, Charles W. *Signs, Language and Behavior*. New York: Prentice-Hall, 1946. 365 p.
9. Pegge, C. Denis. "The Conception of Simulacrics." *AV Communication Review* 7: 24-36; Winter 1959.
10. Ruesch, Jurgen, and Kees, Weldon. *Nonverbal Communication*. Berkeley: University of California Press, 1956. 205 p.
11. Sapir, Edward. *Selected Writings in Language, Culture, and Personality*. Edited by David G. Mandelbaum. Berkeley: University of California Press, 1949. 617 p.
12. Senden, M. von. *Raum- und Gestaltauffasung bei operierten Blindgeborenen vor und nach der Operation*. Leipzig: J. A. Barth, 1932.
13. Stratton, G. M. "Some Preliminary Experiments on Vision Without Inversion of the Retinal Image." *Psychological Review* 3: 611-17; 1896.
14. Stratton, G. M. "Vision Without Inversion of the Retinal Image." *Psychological Review* 4: 341-60, 463-81; 1897.
15. Wendt, P. R. "The Language of Pictures." *A Review of General Semantics* 13: 281-88; 1956.
16. Werner, H., and Wapner, S. "Toward a General Theory of Perception." *Psychological Review* 59: 324-38; 1952.
17. Whorf, B. L. *Collected Papers on Metalinguistics*. Washington, D. C.: Department of State, Foreign Service Institute, 1952.

SIMULACRICS—A REPLY

C. Denis Pegge

The author was formerly general secretary at the Cambridge University Educational Film Council. He is currently engaged in "simulacrics" film research at the Institute of Experimental Psychology, Oxford. His article on "The Conception of Simulacrics" appeared in the Winter 1959 issue of AV COMMUNICATION REVIEW.

ON FIRST GLANCING through the preceding article by James Q. Knowlton I was supported by the thought that before my article (16), which he criticizes, had been submitted to and accepted by this journal, it had been read by psychologists who certainly would have pointed out to me any gross omissions. As I read Knowlton's article more carefully, I saw that—owing to his failure to grasp fully the conception of simulacrics—he was treating contributions as relevant which for the most part were irrelevant, and for the lesser part would have involved an inappropriate elaboration in a short descriptive account.

My article partly summarized ideas contained in a book—as yet unpublished—which was the outcome of a number of years of study. The subject of this study was a unique form of direct and lifelike representation, already exemplified in a few film sequences which seem both to simulate and impose a stream of consciousness on the viewer. Quite apart from the intention and ability of film makers, this form of representation appears to depend on physical characters of the medium used, for example, whether a film is 2-D or 3-D, whether vision is accompanied by speech or by music, and so on.

My work consisted of gathering together relevant psychological information (established and authoritative rather than recent and unconfirmed), relating it to film expression under such headings as perception, consciousness, images, dreams and language, and then insofar as possible, coordinating all the information towards arriving at hypotheses for a possible future science of lifelike representation. This science I called *simulacrics*.

With the full context of my original article before him, I must leave the reader to decide whether I am pontifical and tautological, as also whether I am

not justified in stressing the importance of actual experience over *a priori* reasoning about film effects. Excepting such stylistic, descriptive, general, and minor charges, I will deal with Knowlton's contentions in the order of their occurrence in his article.

He quotes my statements about language standing distinct from thought and says that they challenge the Sapir-Whorf hypothesis—that people belonging to markedly different language families think about their worlds in markedly different ways.

"Contrary to the usual view," Knowlton writes, "language is not simply the vehicle of thought; rather, one's language determines how one categorizes and generalizes about the world." I am in the fullest possible agreement with this variant of the "power of language" thesis that has concerned individual thinkers from Confucius to I. A. Richards, and recurs in the valuable Sapir-Whorf hypothesis. It is not incompatible with my quoted statements that I should be, because in my original article I am using "thought" for processes before categorizing into language expression occurs.

Simulacrics is concerned with the elemental stuff of consciousness before verbalization. It is concerned with processes which seem to include sensory imagery—sometimes exclusively as in dreams. It is concerned with thought at the rudimentary plane and with what, it would appear, is ultimately reducible —in physiological terms—to neural sets or successions of neural sets.

While in this way and others Knowlton shows that he has not grasped the conception of simulacrics, he criticizes my article and tells me what is relevant to simulacrics.

His next objection is to my use of a new term when, he claims, there are plenty of "essentially synonymous terms." But none that he mentions would fit, not even "iconic" which comes nearest.

Morris describes the iconic sign as "similar in some respects to what it denotes" (12: 191, 349). He emphasizes that iconicity is relative (12: 191). He uses the term for single signs considered in isolation, and is mainly concerned with abstract language. On the other hand, simulacrics is concerned with lifelikeness above a threshold value, at such a level that images cease to be perceived as signs. This extended notion—of a whole succession of lifelike images simulating and imposing a stream of consciousness—seemed to require the coining of a new term.

I went out of my way to stress that simulacrics was concerned with a unique particular kind of communication, and therefore shared something of the generality of the whole subject of communication. I didn't make the absurd claims implied in Knowlton's fantastic *non-sequitor* sentence about digital codes such as speech and mathematics being trivial.

Also he is misleading about what I said of sound in films. I made it clear that speech, rather than sound, seemed to decrease lifelikeness; but this is not always evident in Knowlton's version of what I wrote. He uses the word "sound" where I would have used the word "speech." He uses the phrase "mediating processes" where I used "an intervening process of translating linguistic and other signs." What I termed four "possible reasons why sound and, in particular, speech should decrease the lifelikeness of films" (16: 29), he renders

erroneously and even inconsistently thus: "the first reason why sound may provide more noise than information," "Pegge's second argument for the superiority of the silent film over the sound film," "a third reason for eliminating sound," "a fourth reason is that '. . . [is not desirable].'" (The phrase "is not desirable" is even directly attributed to me by being placed within quotation marks!) In view of such variation and mistranslation, what Knowlton says has very little connection with what I wrote. Apart from that, he touches upon problems which are not the particular concern of simulacrics to solve.

The particular concern of simulacrics is with lifelikeness. It has first to establish the existence of media capable of inducing mental processes of the same kind as those occurring during actual life experience, and to determine their physical features. Its concern is with lifelikeness, not primarily with explaining how the brain handles the inputs of the senses, and all the other enormous and complex problems of the brain's working. To have referred specifically to the studies of Hilgard and others whom Knowlton mentions (or, as far as that goes, to a very great number of studies of perception that he does not) would have been out of place in a short article.

However, Knowlton puts one very pertinent question. He asks: "In short, does the cognition of any class of representation *not* require 'mediational processes' "?

Naturally I have pondered whether mediational processes do not occur even in cases of the most lifelike representation. It might be that they occur in some very limited way. In any event, it seems obvious that representation, working through linguistic and other formal signs, necessitates additional mediational processes—processes which must make the whole experience of the representation something quite different from actual life experience.

I disagree with Knowlton's summarizing comment that simulacrics "has a very firm beginning going back quite a number of years." What beginning it has should, surely, be attributed chiefly to studies that are manifestly connected with lifelike representation, and not to linguistic and perception studies that are not so connected. In particular it should be attributed to studies that have related film to thought processes. In this article I have included in my references some studies that—based on such considerations—seem to me relevant to the beginnings of simulacrics, although few even of these studies have very direct relevance (1-10, 11, 13-22). Because of the shortage of theory and an almost complete lack of controlled experiment, I have no hesitation in answering Knowlton's final rhetorical question by saying that simulacrics lies in the future and not in the past.

References

1. Buckle, G. F. *The Mind and the Film.* London: Routledge, 1926.
2. Carpenter, C. R. "A Theoretical Orientation for Instructional Film Research." *AV Communication Review* 1: 38-52; Winter 1953.
3. Cogswell, J. P. *Effects of a Stereoscopic Sound Motion Picture on the Learning of a Perceptual-Motor Task.* Technical Report SDC 269-7-32, Special Devices Center, Port Washington, New York, 1952.

4. Eisenstein, Sergei M. *Film Form.* Translated and edited by Jay Leyda. New York: Harcourt, Brace and Co., 1949. 279 p.
5. Eisenstein, Sergei M. *The Film Sense.* Translated and edited by Jay Leyda. New York: Harcourt, Brace and Co., 1942. 288 p.
6. Faure, J., and Cohen-Seat, G. "Reponses aux stimulations sensorielles de l'activation realisée par la projection filmique." *Revue Neurologique* 90:307-11; 1954.
7. Galton, Francis. *Inquiries into Human Faculty and Its Development.* London: Dent, 1943.
8. Gestaut, H. J., and Bert, J. "EEG Changes During Cinematographic Presentation." *Electroencephalography Clinical Neurophysiology* 6: 433-44; 1954.
9. Gibson, James J. *Motion Picture Testing and Research—Report No. 7.* Washington, D. C.: U. S. Government Printing Office, 1947.
10. Gibson, James J. *Perception of the Visual World.* Boston: Houghton Mifflin Co., 1950. 235 p.
11. Michotte, A. "Le caractère de 'réalite' des projections cinématographiques." *Revue Internationale de Filmologie.* Special issue, October 1948.
12. Morris, Charles W. *Signs, Language and Behavior.* New York: Prentice-Hall, 1946. 365 p.
13. Muensterberg, H. *The Photo-Play: A Psychological Study.* New York: D. Appleton and Co., 1916.
14. Oldfield, R. C. "Le perception visuelle des images du cinema." *Revue Internationale de Filmologie.* Special issue, October 1948.
15. Pegge, C. Denis. "Caligari: Its Innovations in Editing." *Quarterly of Film, Radio, and Television* 11: 136-48; Winter 1956.
16. Pegge, C. Denis. "The Conception of Simulacrics." *AV Communication Review* 7: 24-36; Winter 1959.
17. Pegge, C. Denis. "The 'Silent' and the 'Sound' Film." *University Film Journal* 2: 4-8; Summer 1953.
18. Pegge, C. Denis. "Thought Processes and the Film." *University Film Journal* 9: 3-8; Autumn 1955.
19. Pegge, C. Denis, and Roberts, I. E. "Comparison and Mental Responses to 'Silent' and 'Talking' Films." *University Film Journal* 10: 9-14; Easter 1956.
20. Pudovkin, Vsevolod I. *On Film Technique.* Translated by Ivor Montagu. London: Gollancz, 1929. 204 p.
21. Roshal, S. M. *Effects of Learner Representation on Film-Mediated Learning.* Technical Report SDC 269-7-5, Special Devices Center, Port Washington, New York, 1949.
22. VanderMeer, A. W. *Relative Effectiveness of Color and Black-and-White in Instructional Films.* Technical Report SDC 269-7-28, Special Devices Center, Port Washington, New York, 1952.

The editors of AVCR *are pleased to announce the appointment of George Gerbner as book review editor. Dr. Gerbner is research associate professor in the Institute of Communications Research at the University of Illinois. He is already known to the readers of* AVCR *through his contributions to past issues of this and other journals in the field of communications.*

—KENNETH NORBERG, DEPARTMENTAL EDITOR.

"A THEORETICAL AND PRACTICAL BLENDING"

A review of *Integrated Teaching Materials*, by R. Murray Thomas and Sherwin G. Swartout (New York: Longmans, Green and Company, 1960. 545 p.).

AS THE TITLE OF THIS BOOK indicates, the authors have attempted to avoid old dichotomies. It is their opinion that teaching is a process of communication and that access to a variety of materials enlarges and makes more meaningful the experiences students get from their learning activities.

The authors begin with a consideration of the problem of "Choosing the Best Methods and Materials." The next general division "Reading or Text Materials" concerns the more traditional materials. A section on "Photographed Materials" is followed by "Drawn and Printed Graphic Materials," "Broadcast and Recorded Materials," "Constructed Materials," and "Real-Life Materials." The concluding division consists of two chapters under the general topic, "Displaying and Administering Materials."

This interesting, well written, and skillfully illustrated book is a happy blend of the theoretical, factual, and practical. On the practical side, it contains a wealth of how-to-do-it suggestions. Among the illustrative samples are two newcomers to a text of this kind. One is the excellent section on the development of a radio script. The text gives samples of two treatments of "A Piece of String." Both form a splendid foundation for the authors' comments on the form, style, and student activities expected from such a learning exercise. The other innovation is educational television, for which the book lists and gives an illustration of four kinds of "scripts."

There are a few minor acts of commission and omission which may be worth a mention. The text suggests "lumarith" for hand-made slides in place

of sheet acetate. Red carbon paper is recommended for slides in place of "soft carbon" paper. ASA-film emulsion numbers are given with no caution to use the manufacturer's latest published technical information. Some of the ASA numbers given are out-of-date. Basic information on vidicon and image orthicon cameras and on video tape recorders might have been helpful. Some kind of warning might have been given concerning teachers' unwilling but nonetheless illegal use of copyrighted materials on a television program.

Integrated Teaching Materials represents the publisher's first venture into the market of books on educational communications. It is an important and commendable venture.—*Lewis V. Peterson, University of Illinois*

NOTES AND COMMENTS

A SLIM, 95-CENT POCKETBOOK, brought out without any audible fanfare, is the most useful current introduction into the social aspects of mass communication. It is *Mass Communication; A Sociological Perspective,* by Charles R. Wright of the University of California at Los Angeles (Random House, 1959, 124 p.). Non-specialists interested in communication as a social and cultural process will find the book disarmingly easy to read, and informative without being technical. Specialists will discover unusually lucid formulations of complex and sophisticated ideas derived from social research. Avoiding the pitfalls of either being innocuously non-committal or zealously partisan (and especially the latter), Wright takes the reader through definitions and comparative examinations of communication systems, case studies of audience behavior, analysis of popular culture content, and a functional analysis of effects in the light of research findings. Emphasis on the role of mass communication in the complex process of socialization makes this an especially valuable book for teachers and students.

Although not written as a text (or perhaps because of that), Wright's book makes good reading for the advanced high school or undergraduate student, as well as for the thoughtful general reader. This is more than can be said (at least from where we stand) for *Introduction to Mass Communications* by Edwin Emery, Phillip H. Ault, and Warren K. Agee (Dodd, Mead & Company, 1960, 435 p.). In this ambitious book, an eminent press historian, a working editor and author, and a dean of a school of journalism attempt to give the reader "a full description of the mass communication industries, to introduce him to all areas of professional work in journalism and mass communications, . . . to illuminate for him the importance of the communicator in modern society," and to offer "the general reader a comprehensive picture of the mass media upon which he depends so heavily . . ."

So global an attempt cannot fail to arouse expectations which this book cannot satisfy. The book has the virtue of attempting to compromise between the vocational emphasis which had long

dominated most schools of journalism and the emphasis upon mass communications as social science and a popular education process. But this is a difficult fence to straddle. The general reader interested in educational or other aspects of the "comprehensive picture of the mass media upon which he depends so heavily" will find the treatment of the non-news functions too general and superficial for any purpose other than perhaps that of a required text in introductory journalism courses, for which the book is too obviously designed.

• • •

For those interested in how American popular culture might reveal traits of the "American character" in the period before the Civil War, there is perhaps no better introduction than Carl Bode's *The Anatomy of American Popular Culture 1840-1861* (University of California Press, 1959, 292 p.). Breezy and panoramic, Bode's book deals with the "people's choice" in the "popular fine arts" which, unlike the "critic's choice," fills out our daily lives but is strangely absent from official memories. Popular melodrama, songs, painting, sculpture, almanacs, how-to-do-it literature, religious tracts, cheap novels, and the lecture platform as a popular medium are among the portraits sketched in word and picture in this ante-bellum gallery of cultural profiles at a formative stage of the unofficial American civilization.

• • •

Alfred O. Hero's *Mass Media and World Affairs* (Boston: World Peace Foundation, 1959, 187 p.) is one in a series of volumes designed to summarize communication research pertinent to problems of education in world affairs. This is a useful report, even if the findings summarized are, for the most part, discouraging, and the way they are summarized is somewhat plodding and uncritical. Still, there is no better source of research material available currently for teacher or classroom use in the areas of current events and world affairs communication.

• • •

The scholarly periodical situation confronting students, teachers, researchers, and scholars in communications is chaotic. Readers of AVCR miss much that is of interest to them if they do not also at least glance through each issue of *Public Opinion Quarterly, Journalism Quarterly, Journal of Broadcasting, Film Quarterly,* and *Studies in Public Communication,* to name only a few. While it is true, as a recent DAVI circular stated, that "AVCR is the only learned publication in the communication field that is education oriented," over a period of time each of the other journals carries material of basic educational application and implication. This material rarely reaches that portion of the combined readership which is concerned primarily with research, scholarship, and teaching in AV communications.

This is not to suggest that either a super-journal or a series of mergers is necessarily in order. But the time *is* ripe for some effort at coordination and cooperation among organizations, publications (and, incidentally, conferences), with overlapping interests in communication. This department will, from time to time, endeavor to promote such an effort by noting material of mutual interest to readers of AVCR and the other learned publications.

—*G. G.*

■ FILMS

Duval, D. P., and others.

The Effectiveness, Acceptability, and Feasibility of Technical Training Courses Recorded on Sound Motion Pictures and Slides Plus Tape. Technical Report NAVTRADEVCEN 364-1. Research by the Pennsylvania State University for the U.S. Naval Training Devices Center, Port Washington, New York; June 1960. 30 p.

Purpose: To study two types of recorded instruction—slides plus tape, and sound motion pictures—in order to discover their effectiveness, acceptability, and feasibility for teaching two technical courses in the Navy.

Procedure: Two courses of instruction were provided for recording by the Naval Air Technical Training Unit, Philadelphia. The course, consisting of four half-hour lessons and recorded on slides plus tape, dealt with the operation and maintenance of the Constant Runout Control Valve. The other course recorded in sound motion pictures in 21 half-hour lessons dealt with the operation and maintenance of the Mirror Deck Landing Sight. Effectiveness was measured by comparing the final course grades of trainees instructed solely by the recorded courses with the final course grades of those instructed by the conventional means of face-to-face instruction. The acceptability was estimated by supplying a questionnaire to trainees upon termination of the recorded courses. The feasibility estimate was developed by comparing the production costs and work required in making the two types of recordings. Two-by-two slides and audio tape were used. Sound films were made using a single system sound camera with a zoom lens.

Results: The recorded instruction was as effective as regular instruction. Use of recorded courses was acceptable to the trainees provided it could be justified by a shortage of instructors. Local production of recorded courses is feasible. Production of sound motion pictures requires less time but is more expensive than the production of the slides plus tape. When labor costs were considered, the cost of producing a half-hour film was $119.50; comparable slide-tape recordings averaged $141 per half-hour.—*L. Twyford.*

Schenberg, Samuel

An Experiment in the Use of Films for the Inservice Training of High School Chemistry Teachers. Report of the findings of a project in Brooklyn, New York, sponsored by the Camille and Henry Dryfus Foundation; July 1960. 25 p.

Purpose: To determine the feasibility of using chemistry films for the inservice training of inexperienced and experienced chemistry teachers and to determine the ability of talented high school students to master a beginner's course in chemistry taught mostly by films.

Procedure: Nineteen chemistry teachers were selected to participate in the inservice training experiment. The entire group met for two and one-half hours on Tuesday evenings for four months. Two films were shown at each of the regular evening meetings. Each showing was followed by a discussion and evaluation of the film as a teacher-training device. Evaluation centered upon each step in the motivation, organization, and presentation of the lesson.

The classroom experiment involved the selection of a film and a teacher-participant to present the same lesson to a class of 20 carefully selected students at a meeting of the teacher group. The students were brought in to determine the extent of the contribution of films as a direct teaching medium as well as to evaluate how well a teacher could adapt film teachings to immediate classroom use. This phase of the experiment was performed twice during the course: once on December 8, 1959, when a teacher with three years of experience presented the lesson, and again on January 19, 1960 when the teacher participant was one who had been teaching for more than 15 years.

Results: The inservice training experiment revealed that inexperienced teachers viewed each film as a model lesson which they might adapt to their own needs to produce good results. The experienced teachers compared film teaching to their own at first and then began to select new and different procedures by which they might profit. Both groups of teachers discussed and pointed out weaknesses in the use of films to train teachers. However, these weaknesses were largely attributed to the fact that the films were not originally designed for the inservice training of teachers. The final analysis indicated that films can improve the effectiveness of the instruction of both experienced and inexperienced teachers and that proper use of films would raise the level of supervision because both teacher and supervisor could analyze the film objectively and compare the "live" classroom lesson with the one shown on the film.

The classroom study resulted in general agreement that both the experienced and the inexperienced teacher could adapt film teachings of new and more advanced subject matter, methods, and techniques to immediate classroom use with considerable ease. Students showed a very high degree of understanding of advanced chemical concepts.—*H. H. McAshan.*

■ TELEVISION

The North Carolina Public School System

The North Carolina In-School Television Experiment, 1958-59. Greensboro: University of North Carolina, August 1, 1959. 7 p.

Purpose: To provide an enriched program for junior and senior high schools in North Carolina through the use of television courses taught by expert teachers under the guidance of subject matter and curriculum specialists. The major objectives of the program were: (1) enrichment of teaching by bringing master teachers into the classroom via television; (2) operation of large teaching sections averaging approximately 200 students as a means of freeing certain teachers to assist in other duties; (3) more effective use of school buildings; (4) a comparison between the effectiveness of large group television instruction and regular classroom procedures.

Procedure: The experimental school program was carried on by 43 school systems in 81 schools and in 114 classes of 12,000 participating students. One TV course was

offered at each grade level as follows: eleventh grade American history, tenth grade world history, ninth grade physical science, and eighth grade mathematics. Two studios located at Chapel Hill and at Greensboro Woman's College alternated in broadcasting the class sessions. Six commercial channels contributed one or one-half hour of time per day in order that almost complete state-wide coverage might be obtained. Standard subject matter tests were given in September to experimental and control groups in each school. The same tests in different form were given to the same students in May. The statistics bureau of the State College of the University of North Carolina applied the analysis of covariance to the data obtained.

Results: The mean score of the TV group was more effective in three out of four comparisons made and equal in the fourth. TV instruction of American history was significantly better at the 5 percent level of confidence. There was no difference found in the world history course. General science was improved by television but not to a significant degree. TV instruction of mathematics was improved at the 1 percent level of significance. Thus mathematics was improved the most by television, world history the least, with the two other courses in between.—*H. H. McAshan.*

Irwin, John V., and Aronson, Arnold E.

A Comparison of the Effectiveness of a Live Conventional Lecture versus a Highly Visualized Film Presentation in Television Teaching at the College Level as Measured by an Objective Verbal Examination and by a Film Examination. Madison: University of Wisconsin Television Laboratory, Bulletin No. 11. 29 p.

Purpose: The general purpose of this research study was to compare the relative teaching effectiveness of live lecture and highly visualized film presentation in television teaching at the college level. A secondary purpose was to compare the effects of two conditions of instruction: (1) the class in the studio with the instructor, and (2) the class in a monitor room viewing the instruction via closed-circuit TV.

Procedure: A series of eight areas in clinical audiology constituted the subject matter of the research. Two equivalent types of tests were set forth within each area. A series of two lectures and two films each were presented to the class during two successive class meetings. A written examination was administered during the third class meeting. The remaining eight lectures and films were administered during the fourth and fifth class meetings. At the final examination period a verbal examination was given on materials covered during the fourth and fifth class meetings followed by a film examination based upon the first two class periods.

Results: There was no significant difference (at the 5 percent level) in the relative efficiency of the two methods of instruction—the live lecture and the highly visualized film presentation. The study also revealed no significant difference in gain of factual knowledge whether the students were in the room with the instructor or in a monitor room. The method of testing evidently effected the apparent efficiency of the method of teaching. In film testing, film teaching appeared to be the more efficient; in verbal testing, verbal teaching appeared to be the more efficient. An interesting observation concerning the experiment was that the lack of feedback communication or interaction from the monitor room to the studio room apparently had no ill effects.—*H. H. McAshan.*

Kelley, Fred C.

Evaluation Report on First Year Using Educational Television, 1959-60, Des Moines and Polk County Schools. Des Moines (Iowa) Public Schools, 1960. 20 p.

Purpose: To discover the best areas of instruction that can be taught by television, the effectiveness of large group instruction, and the best allocation of educational staff to provide a high level of instructional efficiency.

Procedure: Seven experimental classes ranging in size from 90 to 135 students viewed open-circuit television. Classes were taught in English, American history, elementary science, reading, arithmetic, and language arts. The Stoddard plan of elementary organization was used. Standardized examinations were given.

Results: Only two classes made slightly lower scores on the post-tests than on the pre-tests. The large-sized television classes showed as much measured growth as those of normal size. Every subject taught by television showed successful teaching.—*L. Twyford.*

■ TEACHING MACHINES

Eigen, Lewis D., and Komoski, Kenneth P.

Research Summary Number I. Automated Teaching Project. New York: Collegiate School. 28 p.

Purpose: To investigate the effectiveness of mechanical teaching machines and programmed textbooks as teaching devices, and to determine the effect of grade level on learning by means of automated teaching methods.

Procedure: Seventy-four male students participated (25 ninth grade, 23 tenth grade, and 26 eleventh grade). The students came from middle and upper-middle class economic backgrounds. The mean Otis IQ for the entire group was 126.8. Students in each grade level were assigned at random to one of two experimental groups—a write-in teaching machine group or a programmed text group. They were told that they would begin learning some mathematical material in a new way and were then acquainted with the particulars of the group to which they had been assigned. Each student was allowed to work on this project for two 30-minute school periods daily. Each subject proceeded in this manner until he had finished the entire program. Upon completion, each student took three tests. These included: (1) a post test on the material covered, (2) a transfer test of items not specifically covered but which are developed during the program, and (3) an attitudinal scale.

Results: The statistical analyses revealed that learning took place with equal efficiency whether an automated teaching sequence was presented by text or mechanical write-in machine. It took longer for the students to complete the program by machine than by workbook. There appeared to be no effect of grade level upon learning, but the transfer ability of the materials learned was better in the higher grades. Other observations included: (1) little effect was noted of grade level upon the length of time needed to learn, (2) the higher grades used the machine more quickly, but the lower grades were faster with respect to use of the programmed text. The conclusions drawn in this study refer to automated teaching in general, but are particularly applicable to the teaching of mathematics. Broadly speaking, this experiment concludes that no difference exists in the effectiveness of mechanical teaching machines and programmed textbooks as teaching devices and that their effectiveness does not depend upon the grade level of the subjects. The greatest criticism of the machines was due to mechanical failures while the long-range cost of replacement of workbooks was also viewed with suspicion by the researchers.—*H. H. McAshan.*

■ TRAINING AIDS

Adams, Jack A.; Hufford, Lyle E.; and Dunlop, James M.

Part- Versus Whole-Task Learning of a Flight Maneuver. Technical Report NAVTRADEVCEN 297-1. Research by the University of Illinois for the U.S. Naval Training Devices Center, Port Washington, New York; June 21, 1960. 60 p.

Purpose: To study the contribution of part-task training to total-task training in a flight trainer and to discover the variables that enhance or diminish the effectiveness of the training method employed.

Procedure: Two matched groups of pilots were trained in a hypothetical toss-bomb maneuver to be performed in the SNJ Operational Flight Trainer. One group had separate training in flight control and procedural tasks; the other had concurrent training in the two classes of tasks. After equal amounts of training, both groups were asked to perform the maneuver in the whole-task version.

Results: Analysis of the whole-task performance of the two groups revealed that only on the first trial was the part-task group less proficient than the group that learned the two types of tasks concurrently. This inferiority was shown only on the procedural aspects of the whole task. The flight control tasks were performed equally well by both groups on the first whole-task trial.—*L. Twyford.*

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